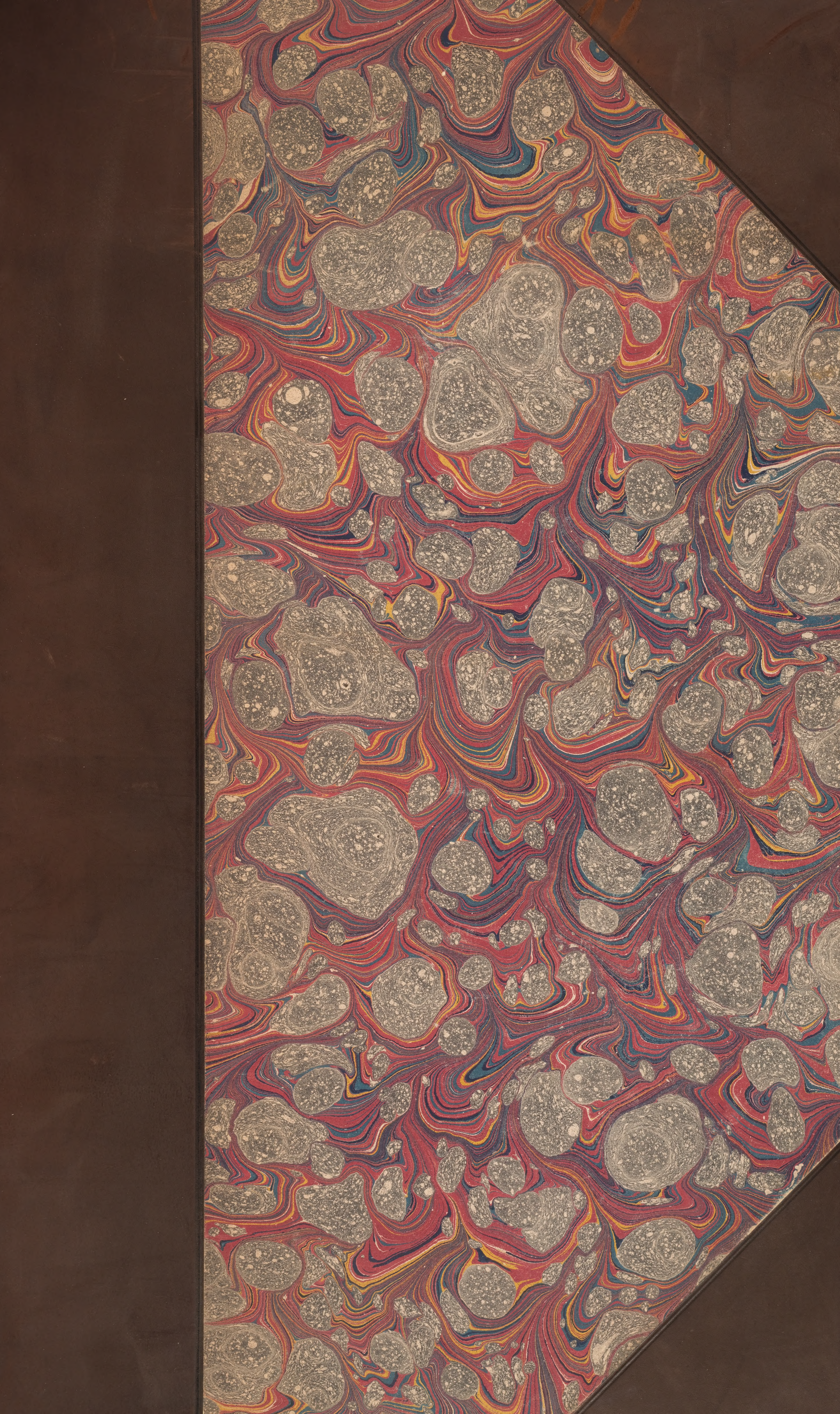




NEREIS BRITANNICA;

CONTAINING

ALL THE SPECIES OF FUCI,

NATIVES OF THE BRITISH COASTS:

WITH A

DESCRIPTION IN ENGLISH AND LATIN,

AND

PLATES COLOURED FROM NATURE.

By JOHN STACKHOUSE, Esq. F.L.S.



BATH:

PRINTED BY S. HAZARD, FOR THE AUTHOR,

And Sold by Mr. J. White, Fleet-Street; London.

NEREIS BRITANNICA;

CONTINENS

SPECIES OMNES FUCORUM

IN INSULIS BRITANNICIS

CRESCENTIUM:

DESCRIPTIONE LATINA ET ANGLICA,

NEC NON

ICONIBUS AD VIVUM

DE PICTIS.

Πολλὸν δὲ παρ' ἑξ' Ἀλὰ ΦΥΚΟΣ. *Hom. Il. 1. l. 7.*

AUCTORE J. STACKHOUSE, ARM. SOC. LINN. SOCIO.



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P R Æ F A T I O.

SPONSALIBUS plantarum marinarum in secreto habitis NEREIS penè tota, (si ita dicam) aquis suis sepulta latuit. Nec mirum, si ita se res habet, florente doctrina sexuali. Classis XXIV^{ta} LINNÆI, ordines IV amplectetur, qui *naturales* appellantur: ex his FILICES, MUSCI, et FUNGI, fructificatione, et habitu inter se invicem sunt affines; ALGÆ, è contra, genera XIII quam maximè inter se discrepantia continet. Ordinem hunc, nec modum fructificandi, nec habitum specierum describens, levitè perstringit cl. LINNÆUS, animadvertens solummodò “ quod etiamnum obscurè quoad fructificationem latent, præter eas, quæ Michelio debentur.”

Recentiores Botanici, paulò accuratius rem perpendentes, ALGAS in *terrestres* et *aquaticas* partiti sunt; et, si Naturam sequamur, Ordines duo omninò constituendi sunt; quorum alter *Jungermanniam*, *Targioniam*, *Marchantiam*, *Blasiam*, *Ricciam*, *Anthoceram*, *Lichenem*, *Tremellam* et *Byssum*; alter *Fucum*, *Conservam*, et *Ulvam* amplectetur. Ordine terrestri prætermisso, observandum est plantarum marinarum genera nullis adhuc certis notis definiri. Quod ad Fucos attinet, character sexualis LINN.

Masc. “Vesiculæ villis intertextæ.”

Fæm. “Vesiculæ adspersæ granis immerfis, apice prominulis.”

“*Semina* solitaria.”

ex LXX ferè speciebus vix x convenit.

In quibusdam è grandioribus, et magis notis, fatès conspicua apparet duplex fructificatio: admonendus tamen est Lector, vesiculas fœmineas haudquaquam *constantèr* in plantâ reperiri, sed solummodò tempore fructificandi; masculas autem * *omni ætate ac tempore* adesse. Notandum est item fibras villosas, nunc *apertas* esse, nunc *tectas*. In *F. serrato* (vid. Tab. 1.) urceoli immerfi in substantiâ folii, fibris villosis ad oras cinguntur: in *F. vesiculoso*, *nodoso*, *siliquoso*, &c. fibræ villosæ in *interiore* vesicularum grandiorum parte sitæ sunt.

Fructificatio mucosa, quandoque granulata, quandoque simplex, in *F. digitato*, *polyschide*, *saccharino*, &c. frequentèr apparet; nulla autem (quoad observavi†) fibrarum vestigia. In aliis, *verruca*; in aliis, *fructus globosi*, *pedunculati*; in aliis, *grana immersa in substantiâ folii* conspiciuntur; adeò ut necesse est genera nova constitui. Quamplurima autem, antequam accuratè definiantur genera, in re tam subtili Lynceis oculis investiganda restant.

A

Quò

* Vid. notulam præfationi Anglicæ subjunctam. Etsi notandum est vesiculas aeriferas in junioribus plantis haud constantèr reperiri; et fibras, seu villos in ore vesicularum aliquando reperiri, aliquando marcescere.

† REAUMURIUS, ut notat D. VELLEÿ *Fuci palmati* superficiem fibrarum seu villorum fasciculis obtectam observavit. Vell. Disq. de Pl. Mar. propagatione, p. 3. et cum sit superficie glaberrima, forsan in *F. digitato*, *polyschide*, &c. fibræ denuò deteguntur.

Quò subtilior tamen est investigatio, eò majore opus est in speciebus discriminandis industria; neque omninò prætermittendæ sunt tabulæ ad vivum depictæ. Icones nostratium extant perpau- cæ, et hæ quidèm, sparsim et per intervalla editæ, numerum dimidio totius generis minorem comprehendentes, è quibus antiquiores, rudes admodùm (ne vitiofas dicam) apparent. Præcla- ra in hoc genere edidere Botanici exterarum gentium; opera autem horum, et partu difficilia, nec sine impensis maximis omninò acquirenda sunt. Littora è contra Britannia, *Fucis*, *Ulvæ*, et *Confervis* mirificè abundant, et post procellas præcipuè tota penè cohors in arenâ projicitur. Hisce perpenfis, FASCICULUM hunc specimen operis, semestri, vel annuo saltèm intervallo suscipiendi, in lucem emitto, nec dubium est quin species omnes, hætenus minùs accuratè de- pictæ, paullatim in unum conferantur, amicis adjuvantibus, et favente DEO.

P R E F A C E.

AMONG the various classes, under which the Vegetable System has been arranged by LINNÆUS, the XXIVth, or those with * “Flowers inconspicuous,” are certainly the most difficult to be ascertained, for which purpose the united aid of Painting and Description is in an eminent degree required. While the other Classes have attracted in modern times the attention of the Botanists of this Country in such a manner, as to leave little to desire further from the Pen or Pencil, it is to be lamented, that many individuals of this class have been as yet very imperfectly described; and that the researches hitherto made have not been sufficient to afford *data* for dividing them accurately into *Genera*. The Families of *Fucus*, *Alga*, and *Conferva*, or “Sea Weeds,” as they are indiscriminately called, form a very beautiful, as well as interesting part of this neglected Class.

The first Family—*Fucus* comprises nearly LXX species: the Fructification, as described by LINNÆUS, is

Male Flowers?

“BLADDERS smooth; hollow, interspersed within with soft hairs.”

Female Flowers?

“BLADDERS smooth; filled with a pulpy jelly: sprinkled with grains, prominent at the points.”

“SEEDS solitary.”

This monœcious character is clearly discernible in some of the more common sorts, but a very material circumstance is omitted, viz. that the former is † *permanent*, and the latter *occasional*. The former is likewise described as having the fibres interspersed *within*, whereas in some instances they are *exposed to view*. The serrated *Fucus* (Plate 1.) is an instance of the fibrous fructification *exposed*: the podded *Fucus* (Plate II, VI.) is an instance of it *concealed*. This contains the most considerable number; but though LINNÆUS, and our English Authors, following his example, have put this as an essential character at the head of the Genus, I have never been able to trace it in more than VIII or X species at the most.

In the large succulent Sea Weeds—the *Saccharine*, *Furbelowed*, and *Fingered*, a jelly-like *pulp* has been observed; sometimes uncovered, and lying in the folds, or wrinkles of the plant; and

* See a most accurate Dissertation on this Class prefixed to Dr. Withering's *Botanical Arrangement*, Vol. 3. extracted chiefly from HEDWIG's *Theoria Plant. Crypt.*

† It may seem strange to apply the term *permanent* to the supposed *male* fructification, as it is not supported by any analogy to other Plants, but it is probable, the fibres may not always be in a *state of impregnation*, as we observe the Catkins on Hazle, and some other trees. Reaumur, who, though an ingenious, is a fanciful writer, has supposed the male fructification to have *Anthems*, though he could never discover them. This does not seem *essential*, no more than that there should be any *Farina*. As the elements of Air and Water differ essentially, the impregnation may be effected by a subtle vapour. At all events, I only offer my ideas as mere conjecture; though it is singular, that without ever reading Reaumur's Essay previous to the writing this Preface, our remarks as to the *Monœcious Character* of so small a number only of the genus, *Fucus* should so nearly coincide.

and sometimes included in a tender pellicle on the smooth surface of the frond; but no granulations, nor the least vestige of the * fibrous process is to be discovered. A considerable proportion of the *Fuci* likewise are furnished with *small, round, dark-coloured granules*, either imbedded in the surface of the frond, or affixed to the stem; which mode of fructification has a near resemblance to that of the fruit-bearing *Ulvæ*. *Pedunculated globules* are observed in another tribe of these plants; and, lastly, *tubercles*, or *warts*, round, flattened, or pointed, of a considerable magnitude for the size of the plant, form a fifth species of fructification.

In the present state of our knowledge it is not to be expected, that the internal Œconomy of these different plants, as far as respects their fructification, can be ascertained with any tolerable degree of accuracy; though it is to be hoped that much may yet be done with the aid of strong magnifiers on the *recent* plants. We may, however, conclude from what has been already ascertained, that the Linnæan character of the *genus* does not hold good with respect to the plants of the four last descriptions, and those plants comprise at least four fifths of the whole number. As far as regards *Ulva* and *Conserva*, the Linnæan character is still more vague; but as none of these families form a part of the present publication, I shall forbear entering upon the subject; more particularly as a very accurate synoptic table of the genus *Ulva* is prepared by my Friend MR. WOODWARD, and laid before the Linnæan Society, which will throw considerable light on the subject. This new arrangement is to be accompanied with descriptions of some newly discovered species. Nor ought I here to omit that this Gentleman, in conjunction with DR. GOODENOUGH, is engaged in arranging and describing the *genus* *Fucus*. This task being undertaken by two Gentlemen, so eminently conversant with those plants, when taken fresh from the sea, and favoured with a free access to the *Herbaria* of ancient and modern Collectors, will doubtless clear up much of the confusion, which has been introduced by erroneous references, and trusting too much to verbal description. Nothing surely can contribute towards a general knowledge of a Family of plants so much, as accurately ascertaining the *individuals*, of which it is composed, and indeed, this ought to precede the establishment of an *essential* character.

Though so little has hitherto, comparatively, been published on the Marine Plants by British Authors, no country in the world more abounds with them than the shores of the Island we inhabit: the more beautiful kinds display themselves in pictures, as we walk on the sands, while the larger ones are frequently detached from the entangled mass, when the weather is moderate, and seem to solicit a place in the *Herbarium* of the Naturalist. It must not be denied, however, that the entanglements and lacerations of the more tender sorts, occasioned by the turbulence of the element which gives them birth, are productive of a degree of chagrin, which is hardly compensated by the pleasure received from the more perfect specimens.

With respect to the execution of the present Work, it is necessary to observe that both the drawings and descriptions have been taken from specimens *fresh from the Sea*; and, as the most
eligible

* Since writing the above I find *fibres* have been observed by Reaumur on the Palmated F. whose surface is smooth and polished as the Plants I am treating of. See Velley's Inq.

eligible mode of displaying them on paper previous to drying, may not be generally known, I shall take the liberty of subjoining it. For this purpose a clean piece of writing paper must be procured of the size of the plant, which must be placed at the bottom of a soup plate, or larger dish, as may be necessary, and flooded with water to the depth of an inch, or more. When this is done, the specimen must be placed in the water, having been first washed in repeated changes of water to clear it of sand, and other impurities. The plant will immediately assume its natural form, and habit of growth; which may be gently assisted by a large needle fastened to a pencil-stick, or any other sharp instrument. When the specimen is in a position to please the eye, the water must be drained off by a gentle inclination of the plate, till it settles on the paper. In this state it must be removed, without suffering the paper to dry, and placed in a quire of blotting paper, under a gentle pressure of books, if no Botanic press is at hand. The following day, or within the space of a few hours in the larger specimens, the plant must be moved into fresh paper, and in many cases it will require shifting every other day for a fortnight, or longer; during which time the drier the room is, the less danger will there be of the plant getting mouldy: and it is necessary to observe that smooth thin cartridge paper is preferable to blotting paper for the subsequent changes. It likewise should be noted, that in case of any of the jelly-like, clammy species which adhere to paper being preserved dry, the operation must be effected by means of *oiled paper*.

The numerous individuals of the genus *Fucus* have been arranged under vi divisions, according to the structure of the frond; they likewise admit of a division with respect to their roots, or bases—into *Fibrous* and *Agglutinated*—and these latter may be subdivided into *Rock-plants* and *Parasites*.

PENDARVIS, March, 1795.

POSTSCRIPT.

SINCE this Work has been finished, and on my arrival at this place, I have met with a very ingenious Dissertation on the Propagation of Sea Plants, written by * a Friend, who by the accidents of War has been stationed on the S. Coast of England, and who has very scientifically employed the leisure, which his military Profession afforded him, in prosecuting his researches in this neglected tribe of Plants. I can truly say I have received a considerable degree of instruction from the perusal of it, as, in addition to his own very accurate observations on the *recent* Plants, he has concentrated and brought together all that has been advanced by the most eminent foreign Botanists on this intricate subject. My opinion respecting the fructification of these Plants is expressed above, together with the necessity that appears to me of forming two or three new *Genera*; my Friend indeed himself† intimates as much: but the supposition of GMELIN of *unisexual* and *asexual* Plants is the most unphilosophic that I could have expected to have

B

met

* THOMAS VELLE, Esq.

† See Inquiry into the Propagation of Marine Plants, p. 8.

met with in this enlightened Age. Let us attend to what HEDWIG, the most accurate and indefatigable investigator of *Cryptogamous* Plants, lays down as a fundamental maxim in his *Theoria*. * “ As in the Animal Œconomy, so among Vegetables, THAT which *of itself* produces a plant similar to its Parent, and which we denominate a SEED, most indubitably originates from a FLOWER.” In plants, whose sexual parts were so small as to elude even microscopic observation unless with compound magnifiers, this ardent Naturalist has actually raised the plants from seeds, and † delineated them in the first stages of their growth.

GÆRTNER’S Treatise on Fructification I had never met with, and consequently the idea of the *tubercles*, i. e. granules of Fructification in marine plants being merely *Gems filled with medullary substance* has now for the first time offered itself to my consideration. This system is liable to the objection made above to the Theory of GMELIN, and, till we see a reason for Nature adopting a more “ simple Process ” in submersed plants, the fact itself can never be admitted. Indeed this ingenious author having arranged the *Fuci* into more and less perfect, i. e. those with *seeds* and those with *gems*; a reason, which might otherwise be assigned for this Process,—their ‡ submersion, must be at once given up.

It must be acknowledged that many processes of Nature are hidden from us owing to the imperfection of our senses. The seeds of the *crustaceous* and *foliaceous* Lichens, of Byssi, and Fungi have been proved to owe their origin to a previous operation of two distinct organized principles. These minute seeds float unperceived in our atmosphere, and § contaminate the air we breathe. Some of these seeds are carried so high in the air as to propagate themselves on the pinnacles of Towers, and on the highest summits of mountains. As these impregnations are carried on in our atmosphere, there can be no reason assigned for the *simple process* of GÆRTNER in the marine genera; and it is more than probable that the || faint cloudy appearance in many of the transparent *Fuci* previous to the formation of the *granule* is an actual *Florescence*. Much may, and I trust will be effected by accurate microscopic observation; but it is probable a complete knowledge of the process will never be attained, as in addition to other difficulties attending the use of high magnifiers, it is more than probable in marine subjects that the parts might collapse on being exposed to the air, or even to the strong light necessary for making the observations.

The remarks made by my Friend on the difference between Sea and Land Plants arising from the absence of roots, structure of the frond, &c. do not hold *exclusively*. Many of the genus *Lichen*; the Tremellæ, Byssi, &c. grow likewise by *Adhesion to the naked Rock*. In fact, the growth of Plants is a silent, but stupendous operation of Nature: when we reflect on the size of the

* “ Veluti omnis proles animantium non nisi generationis actu fit, i. e. combinatione sexualium facultatum pro simili corpore producendo: sic vegetabilium, id, e quo sponte sua simile illo vegetabili de quo venerat pullulat, atque excrescit semen propriè dictum non nisi florum sequi nota indubitataque res est.” Hed. Theor. cap. p. 14.

† Hed. Theor. tab. XIV.

‡ Hedwig and Schmidel have discovered all the sexual parts in an entirely submersed genus—CHARA. Vid. Hed. Theor. p. 125.

§ The heavy air, observable in Woods, is partly occasioned by the fruiting of so many millions of these plants which cover the trunks and branches of trees, as well as the bare spots of earth, &c. &c.

|| Velley’s Inq. p. 5.

the *Oak*, which in the lapse of ages attains its Gigantic Bulk, without drawing from its parent Earth a single particle whose size would hinder its passing through the *minuteſt capillary tube*. Indeed *Vegetable Life* is perfectly analogous to *Animal*, and the veſſels for * abſorbing and throwing off the juices muſt be continued through every part of the former as well as the latter, otherwiſe there could neither be *Life* nor *Growth*, and we may confidently affirm with reſpect to the marine plants from the ſingle circumſtance of the *increase of bulk*, that the nutritious liquor or ſap is as much in a regular and progreſſive ſtate of motion in them as in every other vegetable, though the extreme minuteness of the veſſels joined to other local cauſes may preclude us from demonſtrating it by actual † experiment.

As I am perſuaded the era is not diſtant when the Families of theſe marine plants will be properly arranged, and when clear diſtinct *eſſential Characters* will be prefixed to each: I ſhall cloſe my Obſervations for the preſent, in order to reſume them at ſome future opportunity.

* Thoſe who wiſh to make themſelves acquainted with this abſtruſe ſubject ſhould read Reichel, Malpighi and Grew on the ſpiral veſſels of Plants, and ſee the ſecretory ducts or *Spiracula* accurately delineated by Hedwig, tab. 3. Theor. General, &c.

† See ſome elegant experiments on theſe minute veſſels extracted from Reichel, Hed. Theor. p. 17. and likewise the concluding ſentence of this admirable Work.

BATH, April, 23, 1795.

PHYSIOLOGICAL OBSERVATIONS

ON THE

STRUCTURE AND FRUCTIFICATION OF FUCI.

IN CONTINUATION.

BEING convinced of the insufficiency of the common Pillar Microscope with a single *Lens* to detect the System of Fructification in Marine Plants, and at the same time having a wish to clear up some doubts concerning their internal structure, although by an attentive observation of recent plants I had made some * discoveries on the subject, I determined to furnish myself with higher magnifying powers. My situation within reach of the subjects to be examined, and the opportunities I enjoy, likewise, of investigating them at all seasons of the year in a growing state, made me entertain well-grounded hopes of adding considerably to our stock of knowledge on this interesting subject.

I made my first experiment on the terminating fruit of the serrated *Fucus*, which stands at the head of the *Genus*, and is one of the most common species. Having found some of these in maturity, which was evident from their yellow colour, and a sort of semi-transparency, and, likewise, from the apertures of the external tubercles discharging *mucus* plentifully, I cut out a † transverse slice from the middle, and, having pared off the internal skin on each side of a part of it, I placed the piece on the field of my compound microscope fitted with the lowest power (No. 6.). I perceived that the internal substance, which appeared glossy and colourless to the naked eye, was in fact a beautiful network of capillary threads with ‡ orbicular masses or granules of a different substance, darker coloured, and not reticulated. These masses were either near the internal coat, or adhering to it, and were furnished with five or six pear-shaped seeds each. The external tubercles, of which there were § five in the piece under examination, had very sensible apertures, as viewed under the glass, and communicated with the internal process. Having made this discovery with my weakest power at first, to guard against optical deception, I applied my highest powers (No. 1. 2.) to the same object: with these I plainly perceived that the reticulated transparent fibres, or threads, were in reality *tubes forming || meshes, and intersecting each other; and furnished at intervals with transparent septa, or divisions.*

C

My

* See the Preface to the 1st Fasciculus.

† PL. IX. A. nat. size AA magnified.

‡ In this species the masses containing seeds are rather elliptical, (See B.) one of them highly magnified. In *F. vesiculosus* and most others they are perfectly globular. See C. C.

§ PL. IX. AA.

|| In this species the capillary fibres are wavy and intersect each other in oblong meshes; in the usual fructification of Fuci, where they are not so much compressed, the meshes are square, or hexagonal.

My next attention was paid to the fruit of the bladder *Fucus* in the same state of maturity. I cut out a * slice containing a part of the external coat, and some of the internal clear *mucus*, which was solid enough to bear cutting, and submitted it to investigation under the different powers abovementioned. The same internal structure was visible, but much more beautifully arranged, which arose probably from the fruit having its coats more expanded, and consequently affording more room on the inside. In this, likewise, as the cut was made through the external tubercle, the † passage from thence to the internal orbicular masses was very conspicuous. Having met with *F. bifurcatus* of Major Velley, the *F. tuberculatus* of Hudson, and of the Linnean Transactions, in full fruit, with the summits beautifully transparent, and shewing the granules to the naked eye, when held up to the light, I cut the summit down lengthways, and took out ‡ a slice, and submitted it to investigation, and the internal structure was perfectly analogous to those before described. I have had opportunities during the course of the last year of repeating my experiments on these plants at my leisure, and, likewise, of extending them to the fruit-pods of the kindred species—*F. nodosus*, *F. spiralis*, *F. canaliculatus*, &c. I pursued the same mode of cutting a transverse slice from the middle of the pod, and was happy to find a perfect analogy in their mode of fructification: the only specific distinctions I found, were in the form of the meshes, in the size and shape of the seeds, and in the number contained in each orbicular mass.

A similar mode of fructification I observed in some species of *Fuci*, differing widely in habit from those already mentioned, and not having an appropriate fruit-pod. Among these are to be reckoned the *F. loreus*, a succulent plant with masses of seeds, and internal tubercles throughout its whole length. This plant, on having transverse slices cut through it, shews the tubular organization and the masses of seeds, but with this difference, that the tubes, though occasionally intersecting each other, are in general flexuous and wavy; the granules, or masses of seeds in this species contain from three to six each. *F. tamariscifolius* has its summits above the imbedded bladder pretty much swollen at the time of fruiting, and the dissecting knife discovers the tubular process, and the masses of seeds: *F. caespitosus*, a very minute species recently discovered by me, has a similar fructification, and it may fairly be concluded that many of the shrubby *Fuci* do not differ essentially from those already described.

It having been hinted to me from high § Botanical Authority that the pear-shaped bodies described and figured by me, as they appear in the compound microscope, might not be real seeds, but only *gems*, or particles of the medullary substance of the different plants; as it seemed impossible from their extreme minuteness to dissect their component parts with sufficient accuracy, in order to insure conviction, I resolved to procure, if possible, the spontaneous discharge of the seeds in sea water, in order to submit them to a more accurate examination. I likewise conceived the

* See C. nat. size C. C. highly magnified.

† See Fig. C. C. magnified.

‡ See Fig. E. magnified.

§ Sir Joseph Banks, Bart. K. B. President of the Royal Society.

the idea that I might close my experiment by sowing the seeds on sea pebbles, and by alternate immerfions and emerfions procure seedling plants from those seeds. I felected three fpecies, viz. *F. ferratus*, * *F. canaliculatus*, and *F. bifurcatus*. I carefully detached thefe plants with their bafes uninjured from the rock, and placed them in wide-mouthed glafs jars, with a change of fea water every twelve hours. In the courfe of a week I fucceeded in procuring the feeds, which now appeared † oval rather than pear-fhaped, and, when ripe, burft afunder tranfverfely in the middle with an ‡ explofion: thefe feeds were inclofed in a bright mucus immifcible with fea water, and likewise fpecifically heavier than it; fo as to ferve the double purpofe of carrying them to the bottom, and of affixing them to the rock when fettled there by their gravity. This fpontaneous difcharge of *fimilar fhaped bodies*, all inclofed in a glaffy *mucus*, and all opening tranfverfely, would hardly have needed the additional corroboration of caufing them to vegetate in order to evince their being actual feeds; this, however, I likewise happily accomplished §.

My Friend Major Velley, in his Inquiry into the Mode of Propagation peculiar to Sea Plants, had noticed that the fruit, or pericarp in *F. veficulofus*, and likewise the fructifying fummits

* See an accurate representation of this fpecies with its fructifying fummits in Major Velley's Differt.

† See the remark made by Major Velley on the explofion of a minute grain on the fruit pod of *F. veficulofus*.

‡ See PL. IX. F. n. 1: 2.

§ As many curious Perfons, who occasionally vifit Sea-Bathing Places, may be defirous of afcertaining thefe facts under their own eyes, I fhall detail the Experiments I made. Having procured a number of wide-mouthed jars together with a Syphon to draw off the water without fhaking or difturbng it, on September 7, 1796, I placed my plants carefully in the jars with their bafes downwards, as in their natural ftate; on the following morning I decanted off the fea water, and, letting it fubfide in the bafon, I found a few particles at bottom, which, on being viewed in the microfcope, appeared to be little fragments detached from the furface by fricition in carriage. I then poured a frefh quantity of fea water on the plants, and placed them in a window facing South; on the following morning the jar containing the plants of *F. canaliculatus* difcharged into the bafon a few yellowifh grains, which, on examining them, I found to be the actual feeds of the plant; they were rather oval than pear-fhaped, but the moft curious circumftance attending the obfervation was, that each individual feed was not in contact with the water, but enveloped with a bright mucilaginous fubftance. It was eafy to guefs the wife œconomy of nature in this difpofition, which, as hinted above, ferves a double purpofe; each equally neceffary towards continuing the fpecies. On the following morning a greater quantity of feeds were difcharged by this plant, and at this time a few feeds were procured from *F. ferratus*; but this latter plant difcharged fuch a quantity of mucous fluid, that the fea water in which the plant was immerfed was of the confiftence of thin fyrup, and, confequently, the feeds being kept fufpended, it was difficult to feparate them. The feeds of *F. canaliculatus*, however, were numerous, and vifible to the naked eye, and, after letting the water reft for a few minutes, it was no difficult matter by gently inclining the bafon to pour off the water, and let the feeds remain. In performing this operation I was witnefs to an explofion or burfting of one of thefe feeds or pericarps, which agitated the water confiderably under the microfcope and brought to my recollection the circumftance mentioned by Major Velley during his inveftigation of *F. veficulofus*. I at laft obtained a difcharge of feeds likewise from *F. bifurcatus*; thefe perfectly refembled the others. Having eftablifhed this point, viz. *that marine plants fcatter their feeds in their native element without violence, when ripe, and without awaiting the decay of the frond*, I next procured fome fea pebbles and fmall fragments of rock taken from the beach, and, after having drained off the greateft part of the water in the jar, I poured the remainder on the pebbles. I left them dry for fome time that they might affix themfelves: I then faftened ftrings to them, and alternately funk them in fea water in a wide-mouthed ftone jar, and left them expofed to the air, in order to imitate as nearly as poffible their peculiar fituation between high and low water-mark, and when the weather was rainy I took care to expofe them to it. In lefs than a week a thin membrane was difcoverable on the furface of the pebble where the feeds had lodged with a naked eye: this gradually extended itfelf, and turned to a darkifh olive colour. It continued increafing in fize till at laft there appeared mucous *papillæ*, or buds coming up from the membrane: thefe buds when viewed in the glafs were rather hollow in the centre, from whence a fhoot pushed forth: in fome inftances they feemed to rife on a ^a fhort thick footftalk, and in this latter cafe refembled in fome meafure the *Peziza*-formed feedling of *F. loreus* (fee PL. XII. A. B.), and the others without ftems were like the ftemlefs *Pezizæ* ^b.

^a As this is the cafe, it is very fair to infer that the firft ftage of the plants of this *genus* at leaft is not diffimlar to that which has occafioned fo much furprife in the cafe of *F. loreus*, and that they differ only in fize.

^b Thefe plants continued to put forth the central fhoots for fome time, but their growth was not rapid after the firft efforts; moft probably owing to their confined fituation; and, as I was diftant fix or eight miles from the fea, and had not the opportunity of placing the pebbles in fome

summits of *F. ferratus* had no perforations through the internal tubercles until the seeds were ripe, and ready to be discharged. I had not observed this circumstance, when these two species were investigated by me in my former FASCICULUS; however, I have had abundant reason to be convinced of this fact in the course of my observations subsequent to that time.

As the previous impregnation is effected *internally*, and confined to a particular spot, the monœcious character attributed to these plants by Reaumur, and adopted by me, with a diffidence, notwithstanding, becoming the intricacy of the subject, must be totally abandoned.

The curious process respecting the fruit-pods in the former part of this Essay may with reason be supposed to bear some analogy to the parts of fructification in Land Plants, and we may safely infer that the capillary tubes are fitted to contain an impregnating *aura*, and that this is communicated to the orbicular masses, which at first appear *pellucid*, then marked with *nebulous* spots, and, lastly, discover in a more advanced state the perfect seed. In confirmation of this, it is necessary to observe that the granules composing the *pollen* of land plants may be considered probably as capsules containing a subtle vapour, as they are known to explode. At all events, as the impregnation is effected in perfect seclusion from the sea, the pencils of fibres in the mouths of the cavities in the fronds of some species, and those threads observable in the inside of the air-bladders in others, can have no reference to fructification.

With respect to those cavities with which all the species in Linneus's first division of the *genus* abound, and which give the frond a punctured aspect, as they are found at times with tufts of very fine whitish filaments, and at other times destitute of them, I made them the subject of repeated investigation under all their different appearances. That they are in part, if not wholly, intended for the discharge of a thick, pellucid, mucous fluid, is proved by an easy experiment, and the quantity which the plant * exfudes under water is astonishing. A single plant being put in a shallow pan and covered with a pint, or a little more of sea water, converted the whole into a liquor of the consistence of syrup in the space of twelve hours. The experiment was repeated on the same plant with nearly an equal discharge for several successive days. This fluid was found to be specifically heavier than water, and for some time immiscible with it †.

Having remarked that the punctured frond of *F. ferratus*, which exhibited, when dry, tufts of whitish filaments, when viewed immersed in water under the microscope appeared without
any,

of those pools which are left by the sea at low water, I discontinued the experiment. It is proper to notice in this place how nearly the conjectures of our countryman Morison approach the truth: "If any one asserts that the *Algæ* are produced from seed, or something analogous to it, I do not contradict him; for in some plants there seems something thick and tuberoso, adhering to the leaves themselves; ——— it is probable that a viscous and viscid humour (if it be merely a humour) is produced in them endued with a feminal power." (Linn. Tr. v. 3. p. 89.)—If the viscous and viscid humour mentioned by him had been submitted to a microscope, he would have discovered the actual seed.

* This cannot arise wholly from the decay of the plant, as an ingenious Correspondent of mine, Mr. Dawson Turner, has suggested; it seems to take place in a very short time after immersion.

† In order to ascertain these facts I took an infusion of Cochineal in spring water, and some of the mucous fluid obtained as above, and placing the latter in a drinking glass I poured the tinted infusion gently on it, which remained on top, perfectly unmixed; I then reversed the experi-

any, it occurred to me that those filaments might be nothing more than the exuding *mucus* * hardened and whitened by the sun and air. I fully convinced myself of this fact by repeated experiments. The reason why these plants are sometimes covered with these tufts, and at other times are bare and naked, arises from a peculiarity in them, as they at intervals discharge plentifully, and at other times not, from some æconomy of nature at present unknown to us. In order to ascertain how deeply these *muciferous* vessels were imbedded, I took very thin cross cuts of the frond of the same *Fucus*, taking care to cut through some of these cavities. These slices I placed edgeways on the field of the microscope armed with my highest power, and I found them to be *pitcher-shaped*, and rounded at the bottom; and that they extended precisely to the *middle* of the substance of the frond. From this regularity, and considering that these vessels are found on both surfaces, I conjectured that there was a *diaphragm*, or membrane in the middle. The thinness of the frond not admitting the ascertaining this fact by the instrument, it must rest as yet in conjecture.

I have, however, detected this membrane in the thick leathery frond of *F. digitatus*, and, indeed, it seems reasonable to suppose, as these cavities extend precisely *midway* through from either surface, and as the frond of marine plants is not distinguished, as the leaves of land plants are, by an *upper* and *under surface*, that the absorption of the alimentary juices is effected indiscriminately by either surface, and that this internal † membrane is the channel of communication from the base to the summit. This transverse cut of the frond exhibited to view, besides the imbedded muciferous vessels, a pellucid, colourless, organized *mucus*, appearing to be composed of roundish, or ovate granules; and this, with the two external coats, forms the whole of the frond in by far the greater part of the *Fuci*, being equally to be met with, though not at all times pellucid, in the thick midribs and solid stems of the larger *Fuci*, as in the thinner and more membranaceous fronds of the minute species. It is remarkable that this internal substance, which is of so stiff and horny a texture in the large stems of *F. digitatus*, has notwithstanding a tendency to soften and dissolve in water, and is consequently no other than the same *mucus* a little more solid.

I would not be understood to infer that these pitcher-shaped vessels in the frond of *F. serratus*, *vesiculosus*, &c. are the common organs of absorption, as they are situated at too great distances from each other, and are peculiar to a very few species; whereas the mode of growth is most probably analogous in all. I rather think the absorbent pores of *Fuci* are infinitely minute, as in land plants, situated, however, on *each surface* of the frond; and that these pitcher-shaped vessels, which puncture over the frond of certain species, are designed as excretory ducts, either to

D discharge

ment, and put the tinted water in the bottom of the glass first, and the mucous liquor in this experiment, being poured on the tinted liquor, subsided unmixed to the bottom. Leaving the two glasses till the following morning, the two fluids began to assimilate, and in a day or two the mixture was complete.

* This mucus being of a very thick consistence immediately hardens, as the tide leaves the plant; and if a frond is nicely examined even with a common eye-glass just as it is taken out of the water, the *mucus* will be seen exuding and condensing into strings.

† This membrane consists of reticulated tubes in *F. digitatus*.

discharge superabundant moisture in these vigorous plants, or to generate a mucous liquor of some use in the element they inhabit. These, however, are conjectures, which future experiments must either refute or verify.

From the considerations abovementioned, it is no less certain that the fibrous process on the inside of the air-bladders in several species can have no possible reference to fructification. I have since the publication of the former FASCICULUS examined these bladders on *F. vesiculofus* and *nodofus* in different stages of growth. In the younger bladders the threads are more numerous, and matted together like wool; in those more advanced they are fewer, and many of them are extended across the * hollow part from side to side; in which case they have bubbles † of air imbedded in them, like the beads of a necklace. In those which are full-grown, and whose skins have acquired a proper degree of ‡ elasticity, there are seldom any to be met with, but on the inside of all of them there are globular incrustations. The external surface of these bladders is of the closest texture, and as it were varnished over, which seems wisely contrived to confine the elastic vapour, considering them in the nature of § buoys. If this were not so, the tender, soft skins of the infant || air-bladders would certainly collapse, and we find that as the coats acquire thickness, the fibrous process becomes nearly extinct.

After these discussions on the Structure and Fructification of *Fucus*, as far as they regard those plants, which in my opinion should constitute *the whole of that genus*, it will be proper to continue the observations and experiments I have made on those submarine Plants, which I consider as forming distinct *genera*, during the interval since the publication of my former FASCICULUS. I therein hinted that the fructification of these plants was more difficult, as the parts were infinitely smaller. The *Anomaly* that prevails respecting the plants which constitute the *genus Fucus* is confessed by every Writer, and, however feeble the attempt here made to substitute a better arrangement, it is hoped, it may stimulate abler Botanists to unite their labours in endeavouring to remove the opprobrium that rests on this part of the class *Cryptogamia*.

F U C U S.

FRUCTIFICATION—*a jelly-like mass, with imbedded seed-bearing granules and external conical papillæ—¶ terminating.*

This generic character is taken from Fructification, *as visible to the naked eye*, or a common eye-glass,

* Mr. Woodward suspects from this description, that there is a considerable analogy between these fibres and the air vessels in terrestrial plants.

† See Fig. D. PL. IX.

‡ The bladders at the base of an aged plant of *F. nodofus* are nearly of the thickness of the sole of a shoe.

§ From the buoyancy of these species the Bretons, I am informed, have a singular and very commodious way of procuring large quantities of them for the purposes of agriculture. They cut them and collect them at low water, and confining them with ropes, wait the return of the tide, and placing themselves on the mass conduct them by long poles to the place of loading.

|| It must be observed, however, that there is a thin viscid liquor in the cavities of the infant air-bladders.

¶ The situation of the fructification will form a good generic character between this *genus* and *Ceramium*. *F. loreus* is the only exception.

eye-glass, which it is presumed is a more proper foundation for a system than microscopic observations: similarity of Fructification unites so many in this *genus*, that no generic character can be taken from the frond as in the following ones*.

C E R A M I U M (GÆRTNER.).

FRUCTIFICATION—*a jelly-like mass, without the seed-bearing granules; internal, universal; papillæ invisible.*

I have repeatedly examined the plants contained in this *genus* in all stages of their growth. At times large irregular shaped † bladders cover the frond, and on cutting transversely through these bladders there issues a thin mucous fluid quite transparent, which appears in the field of the compound microscope to be composed of capillary tubes intersecting each other, though not regularly reticulated. On placing this thin transverse slice edgeways under the glass, there appeared numerous small bubbles adhering to the inner coat of the bladder: when these are separated by pressure from the coat, they remain unmixed with the other fluid, as being of much greater density, and form flat circular masses, as they lie on the field of the glass. In these are to be seen by means of high magnifiers extremely minute roundish specks. As these flat masses consist of the same bright glassy dense *mucus*, as that which envelopes the seeds of the species already described, I conjecture that these minute specks are the ‡ actual seeds, and that the bright dense *mucus* surrounding them is to serve the double purpose of gravitation and agglutination. Should this prove to be the fact, there appears to be a greater analogy between this plant and those before described than I at first imagined. The seeds, when ripe, may be seen on the surface of the frond at times with very high magnifiers, either disposed in small clustered masses, or in straight lines intersecting each other. Although *F. polyschides*, which is included in this family, is often found to have the same irregular bladders on the frond, yet, as I suspected that the warty protuberances with which the bulb is covered might serve a double purpose, and occasionally contain seed, I dissected some of those on the upper side, and found seeds imbedded in a clear reticulated *mucus*. These seeds, or pericarps, were roundish, and of a larger size than those of *F. serratus*.

C H O N D R U S §.

FRUCTIFICATION—*an ovate rigid imbedded pericarp ||, containing seeds in a clear mucus, and prominent in either surface.*

These

* The Physiological Observations detailed above apply to this *genus* exclusively.

† See *a. a. a.* PL. III.—It is a doubt whether these irregular bladders discoverable on the frond of *F. digitatus*, &c. are essential to the fructification. Very high magnifiers discover, as I before observed, when the plant has been out of water, very small conical *papillæ* with perforations for the discharge of the seed, where no bladders are found, and these bladders may be occasioned by the expansion of some elastic vapour detaching the upper cuticle at the time of impregnation by accident, as I have never seen them till the plant has been exposed on the beach.

‡ Having macerated some of the frond in changes of sea water, I found at the end of a week what I suspected to be the seeds discharged in the water: they are extremely minute, and each included in a coat of bright glassy jelly.

§ *Xovδρος*—Cartilago.

|| See PL. XI. *F. lacerus*, g. g. g.

These pericarps are visible to the naked eye, and are particularly sensible to the touch, as they project on each side from the frond. They contain numerous infinitely small seeds. Their internal substance is a colourless *mucus* composed of capillary vessels, analogous, if examined under very high magnifying powers, to that of the kinds first described, but the surface of the frond has *no papillæ*. These pericarps, when ripe, often burst asunder, and discharge the seeds on the surface.

S P H Æ R O C C U S.

FRUCTIFICATION—*external globular pericarps, adnate or immersed; sessile or pedunculate; containing seeds as above.*

This forms a very numerous *genus*, as many of the larger shrubby species, and almost all the minuter kinds are found to be tubercled, and it does not appear to me that the tubercles being sometimes *internal* is a sufficient reason to separate them from this *genus*, as it may arise either from accident, or from the plants not being sufficiently advanced in maturity*. There can be no doubt, however, that this *genus*, as well as *Fucus*, as it is here constituted, will hereafter be separated into several distinct *genera*, when the system of cryptogamic Botany shall have made further advances. In the mean time I have thought proper in the † enumeration of the species to follow the arrangement laid down by Dr. Goodenough and Mr. Woodward in their Synoptic Table ‡.

C H O R D A.

FRUCTIFICATION—*a mucous fluid in the hollow part of a cylindrical frond, with naked seeds affixed inwardly.*

This genus is not numerous: the principal one *F. filum* is a singular plant, as will be seen by the description of it in this FASCICULUS. It is necessary to observe that the mention of the seeds in the generic description of this, and the other genera is not strictly consonant to the Rule laid down above, as it requires a pretty good eye-glass at least to perceive them. The detailed account of the dissection of this plant under the article *F. filum* will serve as an additional illustration of this genus.

C O D I U M.

FRUCTIFICATION—*invisible; frond roundish; soft and spongy, when wet; velvety, when dry.*

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* *F. articulatus* and *coccineus* have both external, and imbedded tubercles.

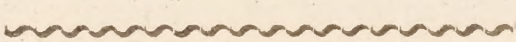
† See the Synoptic Table at the conclusion of the Latin Preface.

‡ Linn. Transf. v. 3. p. 102.—I ought here to notice with proper respect the improved arrangement of *Fuci* by Dr. Withering in his last edition of the Bot. Arr. of British Plants, which is well worthy the attentive perusal of all those who wish for a more intimate knowledge of Sea Plants.

I have not inserted Fructification in the Generic Character, as it is wholly invisible except with strong magnifiers, and as the singularity of the frond is such as not to need it. I have examined it, however, under the compound microscope since the publication of my former FASCICULUS, and it appears to be a congeries of tubes arising from an internal membrane interwoven with and implicated in each other *. These tubes seem occasionally to open and shut, and near the summits are dark-coloured granules, which are doubtless the seeds †.

Besides the above genera a few anomalous species should be noticed, as proper to be referred to a future investigation ‡.

These general Observations on the divisions of *Fuci*, as to the mode of fructification, will I apprehend strike any person conversant with marine Botany, as distinctions sufficiently obvious to justify a departure from the LINNEAN SYSTEM. As to those Gentlemen, who have made these plants the object of their particular investigation, it is presumed they will think they admit of a still farther sub-division. It is for their inspection that I have ventured to arrange the above Synoptic Table, which it is hoped will prove the means of a final and determinate arrangement of sub-marine plants.



The preceding Observations having been made by me in a distant part of the Kingdom, and the course of experiments having commenced immediately after the publication of the former FASCICULUS; I was agreeably surprised at the sight of a Memoir written by Mr. Corrêa da Serra, F. R. S. and published in the Philosophical Transactions for the year 1796. The reasonings of this very ingenious Naturalist on the analogies observable in the vegetable and animal kingdoms are acute and profound, and well worthy the attentive perusal of those who wish to acquire a knowledge of the more abstruse parts of the sexual system. It will appear from the commencement of my researches with a compound microscope, that I had discarded the notion of *male organs* existing in a *filamentous process*, either in the air-bladders of some species, or the urn-shaped muciferous pores of others. Mr. Corrêa da Serra supposes the *mucus* to be actual *pollen*, reasoning from the mucilaginous nature of *pollen* in some families of § Land Plants. My situation affords me no opportunity of examining the plants referred to, which ought to be done under high magnifiers, but it does not seem probable that any resemblance can obtain in the mode of fructification between plants inhabiting different elements, and whose fructification at first sight is so totally unlike, merely on account of this *mucilaginous pollen*. If indeed we go up to the first principle of fecundation—the *aura*; it will probably be found the same in both cases: in the Land Plant, either attached to, or inclosed in very minute granules, which consti-

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tute

* The *Ulva decorticata* of the Linnean Transf. v. 3. p. 56, a very curious plant, Mr. Woodward thinks will rank with *genus CODIUM*.

† See PL. XII. C. c. c.

‡ *F. ligulatus*, *rubens* L. Tr. *lichenoides* L. Tr. *lycopodioides* L. Tr.

§ In the *Apocynæ*, *Orchideæ*, &c. to which may be added *Potamogeton natans*. See the Dissert. Phil. Transf. 1796, Pt. 2d.

tute *pollen*, and which float in our atmosphere: in the submerfed plant, on the contrary, it feems confined in fmall capillary tubes, and carefully fecluded from contact with the water. Thefe tubes are interwoven and furnifhed with *fepta*, or partitions, and *anastomofes*. With refpect to the affertion of Gærtner, that the feeds of *Fuci* have no coat, my experiments evince that they are furnifhed with a coat, and that this coat burfts afunder * tranfverfely. This coat, with the clear, glaffy *mucus* in which the feed is inclofed, feems to form the difk by which the feedling plant attaches itfelf.

* PL. IX. Fig. F. 1, 2, 3.

POSTSCRIPT.

I cannot conclude this Effay without mentioning the Observations on the Britifh Fuci, &c.—a Paper, which has made its appearance in the Third Volume of the Linnean Tranfactions, and which is the joint production of Dr. Goodenough and Mr. Woodward. I * noticed the expectation entertained by the Botanical World on the united labours of two Gentlemen fo eminently qualified for the undertaking, and who, befides, had free accefs to the different Libraries and *Herbaria* both public and private. The Catalogue of Britifh Fuci publifhed by thefe Gentlemen is enriched with many new fpecies, and contains accurate, amended fpecific characters of each, together with very diffufe Observations on the more intricate ones; the whole arranged in a clear and fystematic manner, at leaft as far as our prefent knowledge of Marine Plants extends; but what will for ever merit the thanks of the Botanical World is the fixing the fluctuating and confufed Synonyms of ancient Authors on a bafis which cannot hereafter be fhaken; and, while we advance daily in the Field of Difcovery, we enjoy the heart-felt fatisfaction of being affured, that the labours of our predeceffors can no longer miflead, or confound.

* See Preface, p. iv.

PENDARVIS, Sept^r. 25th, 1797.

“ A MAXIMIS EXORSA EST, ET AD MINIMA PROGREDIETUR
PHILOSOPHIA.”

BURNET. ARCHÆOL. PRÆF.

PRIOREM in lucem edens FASCICULUM, paucula de *Fucorum* fructificatione præmisi, in quibus rem adeò subtilem lente simplici aggressus, haud mirum est sphalmata quamplurima occurrere. Hisce igitur perpenfis, et microscopio, ut vocatur, composito, et maximè augenti instructus, *Fucorum* familiam, illorum saltèm in quibus planiora apparebant fructificationis vestigia, ad examen revocavi.

Portio fructûs *F. vesiculosi* de medio transversim secta imprimis sese obtulit. Gelatina tenax, et vitri instar pellucida (ut nudis oculis, et lente modicè augenti conspiciebatur), opus * tubuloso-reticulatum pulcherrimè exhibuit; granulis orbicularibus seminiferis immerfis, et interiori cutis lateri plerumque affixis. Granula hæc, coloris sub-fusci, nebulis, vel punctulis ab initio notantur; fructu dein maturo, semina pyriformia, vel saltem oblonga quina, vel sena, in singulis granulis cernere est. *Fuci* confimiles fructu sc. mucoso, terminali; ut *F. serratus*, *nodosus*, *spiralis*, *canaliculatus*, &c. similem partium structuram exhibent, maculis retium solummodò in diversis speciebus formâ et figurâ inter se discrepantibus.

In aliis etiam speciebus, ubi nulla extrorsum apparet fructificatio, haud absimilis sese propagandi ratio est. *F. loreus*, ubique gelatinam reticulatam, granis, vel pericarpis seminiferis intus ad intervalla dispositis, cultello transversim, vel longitudinaliter sectus, continuò exhibet. *F. tuberculatus*, vel *bifurcatus*, in † apicibus paululùm incrassatis (cùm penitus sit diaphanus) granula seminifera intus etiam nudis oculis conspicienda præbet. In apicibus *F. ‡ tamariscifolii*, *F. cæspitosi*, aliorumque, fronde cylindricâ vel compressâ, grana orbicularia feminibus confertis, gelatinamque observavimus. In omnibus supradictis speciebus notandum est, ubi fructificatio intus sita est, papillas extrorsum inveniri, foraminibus nunc apertis, nunc clausis, prout maturitas feminum postulat. Semina per hæc foramina sponte in mari exire, muco, vel gelatinâ obducta, § experimento mihi probatum est.

Novum hoc phænomenon, priores omnes REAUMURII, GMELINI, GÆRTNERI hypotheses, necnon quæ de monœciâ quarundam specierum naturâ in FASCICULO priori asserui, funditus evertens

* Vid. Tab. IX. Fig. B. B B.

† Vid. Tab. IX. D.

‡ Vid. Tab. XI.

§ Vid. Experimentum in notulis Præfationi Angliæ subjunctis, p. xi.

evertens statim mihi sese obtulit, nec nisi iteratâ investigatione, post tot illustres Viros, oculis omninò fidendum fuit.

In omnibus, quas adhuc observavi, speciebus materies ista gelatinosa, et pellucida in interiori frondis parte reperitur: in crassioribus, *F. digitato* sc. *bulbofo*, &c. sectione è frondis medio transversim decerptâ, oculo inermi; in tenuioribus, armato, patebit. Tubulosa sit necne ab initio materies hæc, vix adhuc pro certo affirmarem, maturâ tamen ætate semper conspiciuntur tubuli retiformes, dissepimentis ad nodos instructi, *anastomosantes*, et *aurâ* fœcundanti intus, ut par est conjicere, repleti.

Nullo igitur fructificationis funguntur officio vesiculæ aëriferæ, quæ in paucissimis reperiuntur speciebus; nullo glanduli isti, in fronde *F. vesiculosi*, *serrati* occurrentes, et penicillis fibrosis ad oras cincti.

Et si vero in speciebus enumeratis materies ista gelatinosa, retiformis, vel saltem vasculosa, reperiatur, grana orbicularia seminifera in quibusdam è grandioribus, necnon in omnibus fronde planâ donatis, omninò defunt.

F. digitatus, *polyschides*, *saccharinus*, *edulis*, *palmatus*, &c. &c. femina minutissima, et parvitate suâ aciem oculorum eludentia nisi tempore opportuno, interiori cutis parti affixa exhibent. *F. filum*, *thrix*, *flagelliformis* ? feminibus etiam nudis, glomeratis, intus affixis gaudent, fronde tamen adeò diversâ ut necesse est duo genera distincta constituere.

Vesiculas denique aëriferas, quas * olim partem fructificationis masculam intus continere ratus sum, paulò accuratius investigavi. Fila diaphana, lucentia, transversim in vesiculis expansa ferè semper in junioribus cernere est, rarò autem in adultis. Fila hæc † globulis aëris ad intervalla scatent, haud rarò sphæricularum monilis ad instar ordinatis. Pars interior quoque vesicularum aciculis pellucidis, et tuberculis obducta est, unde suspicari libet modo quodam occulto aërem, five vaporem elasticum intus gigni, quo vesicularum latera, alioqui collapsura, distendantur, et intumescant.

Investigationi Fructificationis Plantarum Marinarum per totum tempus, ex quo FASCICULUS prior in lucem prodierit, unicè intentus, notas et characteres quamplurimos hætenus inobservatos, utpote et species quasdam novas animadverti. Quod ad plantas jam a me descriptas attinet, summarium adjiciam.

F U C U S S E R R A T U S.

Vesiculas seu vascula urceoliformia in fronde, queis vim masculam attribui, solummodò multiciferas

* Vid. Præf. Lat. p. 1.

† Vid. Fig. 1x. D.

ciferas esse * experimentis comprobavi. Fructificationis partes singulas in interiori apicis intumefcentis parte fitas, ut in microscopio composito exhibentur, in Præfatione Anglicâ satis copiosè exposui, atque † iconibus illustravi.

Var. β .—Occurrit mihi nuperrimè in CORNUBIA juxta ST. IVES oppidum varietas admodum singularis fronde angustâ, apicibus prælongis, et margine simplici, nec ferrato.

FUCUS VESICULOSUS.

Fibras villosas in interiori vesicularum aëriferarum parte accuratiori indagationi lentibusque compositis subjectas, minimè antherarum, vel filamentorum vice fungi certissimum est. De earum naturâ itemque partium fructificationis in fructu vel pericarpio terminali, vide quæ observavimus in Præfatione Anglicâ ‡.

Varietates hujus speciei accuratissimè notavit D. WITHERING §, M. D.

FUCUS DIGITATUS.

Sectio transversa crassæ admodum frondis speciei hujus structuram internam prorsus singularem exhibet. Membrana intermedia retiformis totam frondem percurrit, substantiâ pellucidâ vasculosâ, utrinque, inter membranam, et cuticulam externam, positâ. Hinc abundè patebit fucum a porulis in fronde absorptum, tubulis, ex quibus constat membrana, per totam plantam facilè propelli posse, modumque crescendi haud ab similem in marinis, ac in plantis terrestribus obtinere. || Vesiculæ irregulares in fronde cultello reclusæ, et microscopio subjectæ, globulis interiori cutis lateri adhærentibus instruuntur. Hi, super vitrum effusi, moleculas circulares, a muco tenui, quo vesiculæ implentur, separatas, et immixtas formant. In his minutissima quædam corpuscula conspiciuntur, quæ proculdubiò, sunt seminula, vix oculo armato conspicienda. Mucus quoque tenuis maximè auctus structuram retiformem maculis flexuosis ostendebat. Provectiore ætate seminula matura coloris castanei in superficie frondis cernere est, vel in orbes congesta, vel lineis rectis producta.

FUCUS POLYSCHIDES.

Tubercula, quibus bulbus in hâc specie obtegitur, in quibusdam individuis transversim secta, femina muco pellucido obducta ostendunt; unde conjicere libet, vesiculas in fronde rariùs produci.

* Præf. Angl. PL. XII. l. 18.

† Tab. IX. f. A. A A.

‡ Vid. Præf. Angl. PL. x.

§ Dr. Withering's Bot. Arr. of British Plants, ed. 3. v. 4. p. 85.

|| Vid. a, a, a. Ner. Brit. fasc. 1. PL. III.

duci. Semina ista iis, quæ in *F. serrato* et *vesiculoso* notavimus, grandiora quidem, et pænè orbicularia. Radix divaricata et ramosa hujus speciei eodem, ac ceterarum disci, instruitur glutine.

Notandum est *Fucum* hunc a D. D. Goodenough et Woodward *F. bulbosum* appellari. Lin. Tr. v. 3. p. 153.

FUCUS SILIQUOSUS.

Seminibus in hâc specie detegendis intentus, filiquas complures maturas, ac immaturas ad examen revocavi. Structura partium interna in diversis individuís varia est: in quibusdam fila longitudinalia simplicia cernuntur; in aliis, pars interior cutis aciculis undique cingitur: septa, quoque, et cavitates vesicularum crystallis pellucidis sæpissimè obtegebantur. Hac partium structurâ liquet folia hæc filiquarum æmula, vesiculas reverà aëriferas esse, et plantæ in aquâ sublevandæ inservire. Fructificationem nuperrimè detexit et mihi mandavit D. TURNER plantarum maritimarum scrutator auspiciatissimus. Forma fructus oblongo-ovata, et acuminata est. Fructificatio interior ut in *F. vesiculoso* et congeribus*; juxta YARMOUTH plantæ fructiferæ, ut mihi mandat, fatís copiosè reperiuntur.

FUCUS SPIRALIS.

Tubercula externa in fructu *F. spiralis* maximè prominent. Fructus quoque in sicco relictus, penicillis† mucis exsudantis, et sole indurati obtectus, formam echinatham præ se fert. Forma fructûs varia; rotundiuscula, oblonga, bicornis.

FUCUS TOMENTOSUS.

Planta hæc microscopio composito subjecta structuram partium *Fucis* dissimilimam exhibet. E tubulis intertextis, et membranæ interiori affixis constat. Tubuli hi, ore nunc aperto, nunc clauso, provectiore ætate ad apices ramulorum evolvuntur, et marcescunt. Seminula in medio tubulorum conspicua, coloris sub-nigri; in singulis, ut videtur, singula‡.

FUCUS PLICATUS.

Recentem, ex quo prodierit FASCICULUS prior, speciem hanc, ad rupes imis maris recessibus in sicco relictam, observavi. Substantia, etiam in plantâ vivâ, lignea est et tenax; fructum verrucosum

* In Act. Linn. v. 3. p. 125. feminum in filiquis repertorum mentio fit. Siliquæ fructiferæ ad apices ramulorum sitæ sunt dissepimento unico longitudinali; congeries feminum minutissimorum intus reperiabantur.

† Vide quæ observavi de penicillis istis supra.

‡ Vid. PL. XII. C. c. c. c.—Generi novo, sub nomine CODII, una cum Ulvâ decorticatâ D. Woodward (L. Tr. v. 3. p. 55.) in enumeratione generum refertur *F. tomentosus*. p. xvii.

rucofum lateralem, apicesque incrassatos, et feminiferos nuper detexi *. Color plantæ recentis ad basim fusco-purpureus, supernè olivaceus.

FUCUS ACULEATUS. p. 24.

Basis plantæ crassa, et quasi spongiosa est; caulis verò ad basim cortice ligneo obductus : substantia interna diaphana, vasculosa.

FUCUS ARTICULATUS. p. 28.

Suspikor plurimas esse varietates ; fructificationem saltem nunc exsertam, nunc innatam esse constat : Specimen unicum saltem fructu pedunculato juxta PENSANCE oppidum collegi.

FUCUS RUBENS.

Species hæc a D. D. GOODENOUGH et WOODWARD *F. sinuosi* nomen obtinuit; *F. prolifero* D. LIGHTFOOT, qui idem est ac *F. crispus* HUDSONI, in Herbario LINNEANO conservato, nomenque *F. rubentis* præoccupante.

FUCUS FASTIGIATUS.

Varietas major nostra coloris olivacei apud D. D. GOODENOUGH et WOODWARD, *F. lumbricalis* ; minor, *F. radiatus* nuncupatur : species radicibus necnon, et fructificatione, distinctissimæ. Illarum descriptiones specificas, necnon *F. fastigiati* LINNEANI, operæ pretium erit accuratius perpendere.

FUCUS VERRUCOSUS.

Species hæc quoque fide *Herbarii* LINNEANI nomen triviale HUDSONI abrogavit, *F. confervoidis* assumpsit ; haud scio tamen an *F. albidus* D. HUDSON. huc referendus sit.

Forfan haud abs re foret numerosissimam *Fucorum* familiam, quum adeò ex omnium consensu sit anomala, in nova quædam genera distribuere, notis præcipuè a Fructificatione, prout oculo inermi apparet, sumptis.

* Fructum semi-globosum lateralem apices etiam quandoque incrassatos, et forsan fructiferos, observavit nuperrimè D. WOODWARD.

SYNOPSIS GENERUM.

FUCUS.

CHAR. GEN.—Fructificatio mucosa, pellucida: granulis sub-orbicularibus feminiferis intus: papillis conicis foratis extus—terminalis.

CERAMIUM.

CHAR. GEN.—Fructificatio mucosa, pellucida, sine granulis feminiferis: papillis invisibilibus—per totam frondem.

CHONDRUS.

CHAR. GEN.—Pericarpium, ovatum immersum, utrinque prominens; feminulis intus in muco pellucido.

SPHÆROCOCCUS.

CHAR. GEN.—Granula feminifera sub-orbicularia; adnata, vel immerfa; sessilia, vel pedunculata.

CHORDA.

CHAR. GEN.—Fructificatio mucosa in cavitate frondis cylindricæ: feminulis glomeratis, nudis, cuti adhærentibus.

CODIUM.

CHAR. GEN.—Fructificatio in tubulis implicatis—frons cylindrico-compressa; statu madido, spongiformis; sicco, tomentosa.

FUCUS.

* *Fructificatione exsertâ.*

F. ferratus,
vesiculofus,
inflatus, *var.*
volubilis, *var.*
divaricatus, *var.*
spiralis,
nodosus,
ceranoides, ^a
canaliculatus,
filiquosus,
filiculofus, ^b
cæspitosus. ^c

** *Fructificatione innatâ.*

F. tamariscifolius, ^d
bifurcatus, ^e
loreus,
abrotanifolius, ^f
barbatus,
granulatus, ^{*}
fæniculaceus,
fibrosus,
natans.

CERAMIUM.

C. saccharinum,
bulbosum, ^g
digitatum,
edule,
palmatum,
phyllitis, ^h
esculentum. ⁱ

CHONDRUS.

C. crispus,
ceranoides,
lacerus,
stellatus,
echinatus,
mamillofus. ^k

SPHÆROCOCCUS.

* *foliis destitutis.*

S. sanguineus,
sinuosus, ^l
hypoglossum,
ovalis,
fedoides,
dasphyllus,
membranifolius. ^m

** *stipite medium folium percurrente.*

S. alatus.

*** *fronde planâ aveniâ.*

S. laceratus,
bifidus,
ciliatus,
jubatus, ⁿ
pinnatifidus,
osmunda. [†]

**** *fronde hinc canaliculatâ.*

S. patens.

***** *fronde compressâ.*

S. corneus,
gigartinus, ^o
coronopifolius, ^p

coccineus, ^q
plumosus,
obtus. ^r
aculeatus. [‡]

***** *fronde teriti.*

S. fastigiatus,
radiatus, ^s
kaliformis, ^t
confervoides, ^v
albidus ?
subfuscus, ^w
pedunculatus,
asparagoides, ^x
tenuissimus, ^y
articulatus, ^z
opuntia, ^{aa}
pinastroides, [§]
variabilis,
amphibius,
plicatus.

CHORDA.

C. filum,
flagelliformis ? ^{bb}
thrix.

CODIUM.

C. tomentosum.

Species fructificatione anomalâ.

F. ligulatus,
rubens ? ^{cc}
lycopodioides, ^{dd}
lichenoides, ^{ee}
membranifolius, ^{ff}
pusillus. ^{gg}

NOTÆ.

^a fide Herb. Linn.—vid. Act. Soc.

Linn. five L. Tr. v. 3. p. 149.

^b nov. sp. tab. xii.

^c nov. sp. tab. xii.

^d F. cricoides, L. Tr. v. 3. p. 130.

vid. Fr. auctam. tab. xii.

^e F. tuberculatus Hudfoni et L. Tr.

v. 3. p. 198.

^f Sex quæ sequuntur species habitu F. tamariscifolio affines, *Fuco* potius quam *Ceramio* forsan referendæ sunt.

* nov. sp. L. Tr. v. 3. p. 131.

^g F. polyschides Hudfoni.

^h Fructificatio forsan in vesiculis.

vid. tab. ix.

ⁱ Species hæc in teretem, et tetragonum dividitur, L. Tr. v. 3.

p. 149.

^k nov. sp. L. Tr. v. 3. p. 174. af.

finis planta, fructu tamen in

medio mamillarum, nec utrinque

prominens, ut in ceteris.

^l F. rubens Hudfoni, &c. pericarpia in fronde aliquando obser-

vavit D. Woodward, unde

Chondro forsan melius associandus foret, utpote et F. sanguineus, &c.

^m nov. sp. L. Tr. v. 3. p. 120. una

cum figura.

ⁿ nov. sp. L. Tr. v. 3. p. 162. una

cum Fig.

[†] nov. sp. tab. xi.

^o nov. sp. L. Tr. v. 3. p. 183. ico-

ne adjunctâ.

^p nov. sp. L. Tr. v. 3. p. 185.

^q Fructificationem duplicem obser-

vavit D. Woodward, in hac

plantâ innatam et exsertam

idem observavi in F. articulato.

^r Haud scio an species hæc sit eadem ac species a D. Velley delineata.

[‡] Fructus F. acul. sing. admodum:

haud scio an femina intus contineantur, vel extus, ut in fragariâ.

^s nov. sp. L. Tr. v. 3. p. 202.

^t nov. sp. L. Tr. v. 3. p. 206. ico-

ne adjunctâ.

^v Fucus verrucosus Hudfoni, nomine ex Herb. Linn. sumpto.

^w nov. sp. vide icon. L. Tr. v. 1.

p. 131. una cum descriptione

fructificationis racemosi.

^x nov. sp. L. Tr. v. 2. p. 29. tabulâ adjunctâ.

^y nov. sp. L. Tr. v. 3. p. 215. tab.

adj.

^z Duplicem in hac specie fructificationem, exsertam sc. et innatam, nuper detexi.

^{aa} nov. sp. L. Tr. v. 3. p. 219,

[§] F. incurvus D. Hudf.

^{bb} F. flagelliformis, D. Lightfoot,

F. confervoidi refertur, L. Tr.

^{cc} Granula D. Lightfoot forsan nihil aliud sunt quam foliola

convoluta.

^{dd} Fructificatio forsan eadem ac F.

pinastroidi.

^{ee} Species singularis, Licheni quam

Fuco affinior. L. Tr. v. 3. p.

191.

^{ff} nov. spec. tab. vi.

^{gg} ib.

PHYSIOLOGICAL OBSERVATIONS

ON THE

STRUCTURE AND FRUCTIFICATION OF FUCI.

IN CONTINUATION.

A CONSIDERABLE Interval has elapsed since the Publication of my Second *Fasciculus*. This Delay has been occasioned partly by the arduous nature of the Undertaking, and partly by the remoteness of my situation. This Interval, however, notwithstanding any seeming inattention to the Public on my part, has not been misemployed by me. I have been enabled very carefully to revise and correct what I have already published, and, what is a far more important Object, I have pursued my Investigations on the different Species of *Fuci*, during their respective seasons of Fructification in succeeding years.

The present *Fasciculus*, together with the Appendix, * contains all the Species comprised under Genus *Fucus*, which have been hitherto discovered in the British Islands; and will terminate, for the present at least, a Work, which cogent reasons have induced me to contract. † I have availed myself of all the assistance which a personal Examination of the *Linnean Herbarium*, the *Horti Siccæ* of Dr. DILLENIIUS and BOBART at OXFORD, and the copious and scientific collections of Messrs. WOODWARD, TURNER, PITCHFORD, and WIGG made on the NORFOLK Coast, as likewise the communications of my various Correspondents and Friends in other parts of the Kingdom could afford me, in order, as much as possible, to settle every disputed point.

I have it likewise in my power to add a List of some foreign Synonyms that have not yet made their appearance in our language. Professor ESPEr has published a work at NUREMBERG entitled ‡ *Icones FUCORUM cum characteribus systematicis, synonymis AUCTORUM, et descriptionibus novarum specierum*, 1798. This Work does not furnish much original matter descriptive of the habits of the different Species, but is very copious in Synonyms, and the Author's Plates are in many cases characteristic, but with that degree of stiffness which is unavoidable in copying dried Specimens. The learned Professor does not appear to have studied this Genus in its *growing state*, and what seems extraordinary in the present times, he discards all investigation into its Physiology: § indeed the existence of seeds is in one place doubted by him.

* As many Species have been recently, and very accurately delineated, it would have added greatly to the Price of this Work, if I had given them *de novo*. However, for the accommodation of those, who are not in possession of those Publications, or who may wish to have delineated Specimens of the whole Genus in one Work, I shall leave Drawings with the Lady who has coloured the Plates for this Work, of all the Species enumerated in the Appendix, and Sets to bind up with the Work will be ready to be delivered on application to the Publisher.

† I at first meant to include *CONFERVA* and *ULVA* in this Work, but the length of time which the Investigation of the present Genus has occupied, deters me from the undertaking. I have no doubt of its being executed by some abler hand. The *Confervæ* in particular, a very numerous Family, have had very little scientific pains bestowed on them: nothing but drawings of their internal structure under a Microscope will be capable of illustrating them satisfactorily. Till such a work appears, I would advise Collectors of Marine Plants to delineate in Pencil, or Colours, a small bit under a microscope to shew the internal structure, and to lay down the Plant on the Paper underneath.

‡ This Work comes out in *Fasciculi*: the first contains 22 Species; the second 33; two are in my possession, and a third is since published.

§ “Kerne, oder Saamen, hat man noch nicht wahrgenommen: andere enthalten eine schleimigte Masse, in welcher aber keine Keime zur Pfortpflanzung zu bemerken waren.” Esp. Ic. p. 5.

I have been much assisted, with respect to Fructification, by the "Calendar of marine Plants," published by my Friend Mr. TURNER, in the Fifth volume of the LINNEAN TRANSACTIONS. Many Species of *Fuci* do not begin to fructify till late in the Autumn, and the process is not mature till the middle of Winter, when most marine Botanists have quitted the Sea-side. This has been the reason why the Fructification of many Species has been hitherto unnoticed. I am happy to assure my Readers, that they will find this important point very considerably elucidated in the following Pages. A circumstance of a curious nature has occurred in pursuit of these investigations. Many Species of *Fuci* exhibit a remarkable variety in the mode of fructifying. *F. articulatus*, *F. coccineus*, *F. hypoglossum*, *F. incurvus*, *F. diffusus*, are among the number. Sometimes these dimorphous Fructifications, if I may so call them, are found on different branches of the same Plant, but more frequently on Specimens from different shores. This circumstance attracted the observation of Messrs. GOODENOUGH and WOODWARD under the article *F. hypoglossum*, and they solicit the attention of future Botanists to investigate the cause. Dr. SOLANDER, in his M. S. in the Bankian Library, expresses a doubt whether they are not male and female of the same Species. This Idea is combated by the learned Authors of the Dissertation, who think both appearances are that of female Fructification—that the granules are the "first visible appearances of the female Fructification, and that some of them swell into tubercles, whilst others are abortive and disappear." They however start an objection as to the local situation of these different appearances: Linn. Tr. p. 45. My Friend Mr. WOODWARD, in the course of my correspondence with him, suggested that the granules are the ripe seed after the Tubercle has been burst and the coats fallen off: but the regularity of their position, like the dots on the leaves of *Polypodium* forbid that idea. As to the hypothesis above-mentioned, of the granules becoming tubercles, it is completely destroyed by some of my recent discoveries, more particularly by the fructified Summits of *F. coccineus*. This species at times is found with large lateral orbicular Tubercles; * at other times, there is a small panicle generally branching into three or four heads, but sometimes quite racemose. † I have discovered minute granules in these branching seed-vessels; but my Friend Mr. PIGOTT, who contrived with a part of his Telescope a Microscope of high powers, assures me that these branches are furnished with regular rows of blood red orbicular granules; and he has favoured me with a specimen wherein many of these seed-vessels appear to have discharged their seed, and to have become yellow, and in a state of fading. ‡ This therefore proves that they are real capsules. The differences in the form of Fructification in *F. Pinnastroides* and *F. diffusus* are not less remarkable, as may be seen under their respective Articles. These facts are undoubted: but in what manner shall we solve the difficulty, in reasoning on the analogy between these cryptogamous fructifications, and the œconomy of Nature in the classes of Land Plants? We must have recourse either to *monœcious*, or *diœcious* Fructification, or we must admit Fructification of different kinds in one and the same Species. There are however difficulties attending other genera of cryptogamous Plants. Many *Lichens* are known to produce shields very rarely, though they are propagated as abundantly as those which abound with them—most probably from seeds matured on the surface without the assistance of Shields. One instance of two different kinds of Flowers, both hermaphrodite, is asserted to ob-

* See Frontispiece. *F. coccineus*. a, 2.

† See Frontispiece. Ditto. b, b, c, c.

‡ Ib. d.

tain in the same individual Species. Sign^r. MARATTI is the Discoverer of this Fact, and the instance adduced is the *Filix Lonchitis*. *

Doubts have been expressed † as to the Fact mentioned in my Note, p. xi, respecting the experiment of sowing the seeds of *F. canaliculatus*; and it was suggested, that pebbles which had never been in Sea-water should have been made use of. If my situation for a proper length of time would have admitted it, I should have gladly repeated the Experiment; but when it is considered that the pebbles were taken from the beach, where by means of their constant friction it was impossible for any previous seed to have remained affixed, and that the seeds vegetated on the precise spot where the drops of water containing the seeds were poured, I think those doubts can no longer be entertained. The seeds of *F. vesiculosus*, *ferratus*, and other punctured coriaceous *Fuci* were found to be pear-shaped. ‡ I have since discovered that different *Fuci* produce differently shaped seeds, and from thence surely generic distinctions may hereafter be obtained. The smooth-skinned opaque *Fuci* have orbicular seeds. *F. lumbricalis*, *fastigiatus*, &c. have kidney-shaped or curvilinear ones, and probably still further discoveries will be made towards establishing *Genera*. §

On Inspection of this and the preceding *Fasciculi*, the Catalogue of British *Fuci* will appear to have increased since the publication of the Paper of Dr. GOODENOUGH and Mr. WOODWARD, in the Third Volume of the Linnean Transactions; and there can be no doubt but the present ardour for marine Botany, and the immense extent of Shore we possess, will occasion the discovery of many new Species.

F. SHERARDI. ——— This Species, which is the subject of the Second Article of this *Fasciculus*, has been separated by me from *F. spiralis*.

F. VIRIDIS. ——— This very beautiful Species has been recently found here. It was noticed abroad in the FLORA DANICA, and first found on the English Coast, as I am informed, by Sir THOMAS FRANKLAND, Bart. The Specimen, from which the Drawing is taken, was communicated by my Friend Mr. TURNER, to whose indefatigable researches the Botanical world, I trust, will owe many more obligations.

F. FRUTICULOSUS. ——— The same Gentleman has likewise discovered *F. fruticulosus* on the Western Coast, and as he means to publish a Description and Figure of it in the next Volume of the Linnean Transactions, it is here given in the Appendix; accompanied however by a Drawing for those who choose it from a Specimen of my own. It may be proper to notice, that *F. diffusus*, *F. Pinnastroides*, and *F. Lycopodium*, have evidently the internal structure of *Genus CONFERVA*. They are, however, on account of their general resemblance to *Fuci*, their size, and the opacity of their outer skin, as well as with proper deference to the authority of Dr. GOODENOUGH and Mr. WOODWARD, admitted into the present Catalogue.

* Ioh. Fr. MARATTI Liber rarissimus de verâ florum existentia in plantis doriferis. Gottingæ 1790.

† Analytical Review.

‡ See Tab. ix. B. F.

§ ROTH in his "*Bemerkungen*" advances an opinion, that not a half, and probably not more than a third of the species of submersed plants, is as yet discovered. p. 66.

F. TOMENTOSUS. ——— Since the publication of my former *Fasciculi*, I have had an opportunity, in company with Mr. CORREA DA SERRA, of consulting OLIVI'S ZOOLOGIA ADRIATICA in the Library of Sir JOSEPH BANKS, Bart. That learned Naturalist has formed a Genus, which he calls LAMARKIA, the Species of which are two: 1st. *L. Bursa* *—2d. *L. Vermillara*: the first simple, the second branched. The structure of the Genus consists, he says, of "pellucid bladders or tubes, † hollow, pellucid, and filled with a transparent aqueous fluid, "together with other minute capillary filaments for the purpose of imbibing water, and dis- "charging the seeds, which are at this period easily to be distinguished: a structure in which "these bladders and filaments are entirely composed of a delicate, equable, transparent mem- "brane, in texture as in every other essential character, resembling *Fucus*, and *Ulva*: a structure, "which instead of dissolving and decaying away, grows firm and hardens: which has not the "least portion of animal substance, is not endued with spontaneous motion, and emits no offen- "sive smell on being destroyed. Its fructification in fine is like that of Genus FUCUS, consisting "of globular congeries of seeds in membranaceous pericarps." The second Species called *Lamar- kia Vermillara*, is illustrated by a Drawing, and there cannot be a doubt that it is our *F. tomentosus*. ‡

F. SELAGINOIDES. ——— Messrs. GOODENOUGH and WOODWARD have inserted this Species in their catalogue on the authority of fragments of plants and imperfect specimens thrown on our coast; having never seen it, as they acknowledge in a growing state. Being well aware of the different appearances of *F. Tamariscifolius* § in its different stages of growth, I then had my doubts of the existence of *F. selaginoides* as a British species. The Gentlemen above-mentioned have said nothing of the imbedded air-bladders in this species, which are always seen previous to the fruiting of the summits. Mr. WOODWARD, in the course of our correspondence, has favoured me with a sight of his Specimens of *F. selaginoides*, and I have no hesitation in pronouncing them fragments of *F. tamariscifolius* with the leaflets swollen at the base. Professor GMELIN'S Pl. ii. A. called by him *F. Abies marina*, and which is referred to as a Synonym, differs entirely from his verbal description, which Messrs. G. and W. acknowledge; as does likewise Professor ESPEY'S Tab. xxxi, in his late publication; he has delineated an undoubted specimen of *F. tamariscifolius* for it. In my visit sometime ago to Sir JOSEPH BANKS'S Library, I met

* The *Alyonium Bursa* of Linn. Bauhin, &c.

† "Una fabbrica semplicissima di null' altro composta che d'un puro aggregato di otricelli a cavi, pellucidi, è ripiene d'un fluido trasparen- "te, aqueo; è soltanto munite di altri minimi filamenti capillari destinati ad assorbire l'acqua, ed a espellere i semi già manifestamente ricon- "noscebili: una fabbrica, in cui queste parti, tutti uniformi, non sono composte che d'una membrana sottile, equabile, consistente, lucida, "sicca, è perfettamente simile nel tessuto, è in tutte gl' altri caratteri a quelle, onde sono formati i FUCHI, le CONFERVE, è l' ULVE: "una fabbrica che, in vece de' spappolarsi, è corrompersi resiste e si secca: che non ha la più piccola porzione gelatinosa vivente, è che, pu- "trificandosi non dà ni odore, ni residuo animale, e non palesa alcun movimento spontaneo, una fabbrica finalmente, che come le ALGHE ha i semi globosi, collocate ne' vassellini membranosi, componenti tutto il suo corpo." Olivi Zool. Adriat. p. 258.

‡ See Tab. xii. c, c, c. The Author one would imagine had this figure before him.

§ I ought just to notice in this place an error of the Engraver in representing some dark coloured punctures on the surface of this Species, Pl. vii. Its texture should have been delineated smooth and velvety. Since the publication of the last *Fasciculus*, this Species has been delineated in English Botany, but nothing is said of its curious structure, which was described, Pl. xvii, xxii, and a summit delineated by me, Pl. xii. c. c. c. previous to that publication.

§ *F. ericoides*. Linn. Tr. v. 3. p. 130.

with an inedited Set of Plates of marine Plants and *Zoophytes* of the late Professor MICHELI: among these is one inscribed *F. Abies marina* Gmel. differing very materially from Pl. ii. A. of that Author, but exactly according with his description. Unfortunately no Letter-press, or manuscript, accompanies these Plates, to inform us where the Specimen was collected.

F. ROSEUS ——— Is a Species recently discovered by me on the S. W. Coast. I had before seen it, but not in fructification, and from its naked straggling habit I had taken it for the lacerated stem of *F. sanguineus*. Its beautiful racemose fructification distinguishes it readily, when in this state, and it is not unlikely that it fructifies only during the Winter months. I only possess two or three Specimens; one of which, however, shall be presented to the LINNEAN SOCIETY.

F. CARTILAGINEUS. ——— My much-lamented Friend Dr. WITHERING sent me, some time previous to his decease, two Specimens of *F. capensis*, the original *F. cartilagineus* of LINNEUS, differing greatly in splendour of tints from the real Cape Specimens, but not unlike the Northern Specimens of *Horn-tang*, which ESPER describes as being of a yellowish colour.* These specimens had a Label in the Dr's hand-writing "*from Freshwater Bay, I. of Wight.*" As I understood by his Letters, that Mrs. WATT of BIRMINGHAM had sent him these specimens, I had great hopes of adding this Species to the British Catalogue, especially as I had read in Bishop GUNNER'S FLOR. NORWEGIÆ, and since in Professor ESPER'S work that *F. cartilagineus* was a native of the North. I accordingly wrote to that Lady, and she was so polite as to furnish me with a Packet of Sea Weeds in a rough state, collected by her at FRESHWATER BAY, which she informed me, "had been submitted to Dr. WITHERING, who *selected* what he "wanted, and returned the Parcel." Several large Specimens of *F. coronopifolius* in fructification were among them, which in their dry state appeared *horny and cartilaginous*,† but not the slightest branch of *F. cartilagineus*. I therefore for the present, though with reluctance, omit this elegant Species, not without a hope however from the Dr's Label, and the testimony of Mrs. WATT, of his having "*selected Specimens from her Parcel*," that this Native of the Northern Seas will by some future Botanist be added to the British Species.

F. UNDULATUS ——— Is likewise another Species separated from the punctured coriaceous *Fuci*. I hope the characteristic marks I have enumerated will sufficiently justify this Arrangement.

F. LONGISSIMUS. ——— I have here departed from the Catalogue of Messrs. GOODENOUGH and WOODWARD in arranging these Species under three trivials instead of two—viz. *Confervoides*, *Longissimus*, and *Gracilis*.

F. COSTATUS. ——— A newly discovered membranaceous *Fucus*, from the Coast of CORNWALL, having a nerve pervading the frond.

* "Diese nordische sind von gelber Farbe." Esp. Ic. Fuc. p. 15.

† Mr. HUDSON formerly mistook *F. coronopifolius* for *F. cartilagineus*, most probably from this rigid appearance when dry:

F. PALLESCENS. ——— A non-descript Parasitical Species, with a singular Fructification.

F. DISCORS. ——— This Species of LINNEUS and HOUTTUYN has been discovered to be a Native of these Islands. I collected it at SIDMOUTH several years ago, and sent it to Mr. WOODWARD as an unknown Species. Its Fructification is singular; this however has not been remarked either by LINNEUS, HOUTTUYN, or ESPER. I do not vouch for this being precisely the same Species with Professor ESPER's *F. discors*, as he describes "two rows of dark coloured oblong grains" on each side of the nerve which pervades the Leaf* when viewed through a Microscope, which must, I think, be seeds, and besides it is to be remarked, that his Pl. xxvi, has no terminal racemose fructification.

F. GRACILIS. ——— An affinity of *F. longissimus*, substituted in the place of *F. albidus*, LINN. TR. from which it materially differs.

F. PALMETTA. ——— This Species of Professor ESPER, Pl. xl, which he has confounded with *F. sinuosus*, Pl. xlii, is by no means unfrequent in Cornwall. My Friend Mr. TURNER very lately discovered its Fructification, which has established the Species.

With respect to the clusters of capillary vessels, or pencils of whitish filaments which occupy the surface of the frond in *F. vesiculosus*, *spiralis*, &c. &c. which I had asserted to be strings of exuding mucus, my Friend COL. VELLE has noticed them in a very interesting Paper, he has just published in the 5th Vol. of the LINN. TRANS. in which he pursues the investigation into the nature and propagation of marine Plants. He there asserts that "these strings are certainly tubes; that they remain in an unaltered state in the water, and are discernible by means of an aquatic Microscope." Of this fact I have no doubt, from the accuracy of my Friend's experiments. I had asserted that the mass of *Mucus* exuded in a large vessel was immiscible with water, and proved it by Experiments with tinted water: † I am not in the least inclined to controvert the opinion that these whitish hairs may be capillary filaments through which this thick *mucus* exudes. ‡ I have since bestowed great attention on this subject, and, as the fronds of these coriaceous *Fuci* are covered with infinite numbers of these pencilled fibres, which are discernible even on infant Plants, § some wise purpose in the œconomy of Nature is most probably intended to be answered by them, fructification being out of the question. On this occasion the Observations made by DR. PRIESTLY, in his Treatise on Air, strike me very forcibly. He says that "great

* "Langst dieser Stiele sind, unter der Vergrößerung, doch nur gegen das Licht gehalten, zwey Reihen dunkler langlicher Körner." Esp. Ic. p. 60.

† See Page xii. ROTH, in his generic character of *Fucus*, says these pores discharge *mucus*—*poris mucifluis*. Bemerk. p. 32.

‡ I have thought it right in addition to the representation, Pl. i, to give a magnified drawing of a transverse section of the frond (Pl. xiii. a.) of *F. ferratus* placed edgewise on the field of the Microscope; by which it will appear that the urceolate vessels, as I observed, p. xiii, only penetrate to the center of the frond from either side. The above section is illustrative of the generic character of *Genus Fucus* in ROTH's Bemerkungen, p. 32. "Vesiculæ aggregatæ in substantiâ frondis nidulantes."

§ These *Papillæ* are very numerous even on small seedling Plants. I have a small Specimen of *F. ferratus*, which, though not exceeding an Inch and half in length, has 43 of these *Papillæ*.

“quantities of pure dephlogisticated air are given up from the * summits of Sea Plants, which
 “serve to prevent pure water from becoming putrid: the minute divisions of the leaves in several, and the papillæ † in others, seem to serve a purpose hitherto unattended to.” Had it fallen in with this ingenious Author’s plan to have pursued his investigations on growing Plants, he would have found what immense quantities of *mucus* undoubtedly impregnated with this pure air, a single plant will produce; and when we consider how many thousand Acres, or rather square Miles of Rock, are covered with these *Fuci*, which, from their tough coriaceous texture, seem least adapted for the food of Fishes, and that these plants occur chiefly in our harbours, and inlets of *fresh water*, we can have no doubt that this Theory will admit of an extensive application.

Since the Publication of my last *Fasciculus*, I have read with great satisfaction the Remarks of a celebrated Naturalist, Dr. ALBRECHT WILLIAM ROTH of BREMEN, on the Study of cryptogamic Water Plants, ‡ subsequent to the appearance of his *Catalecta Botanica*. He has divided these Plants into Nine *Genera*.—1. FUCUS. 2. CERAMIVM. 3. BATRACHOSPERMUM. 4. CONFERTA. 5. HYDRODICTYON. 6. ULVA. 7. RIVULARIA. 8. TREMELLA. 9. BYSSUS. § His generic Character of Fucus is “Vesicles aggregate, imbedded in the substance of the Frond, furnished with mucifluous Pores.” || This concise and expressive description exactly agrees with the structure of the Frond of the punctured coriaceous *Fuci* described in my First *Fasciculus*; ¶ but the term “aggregate” shews the Author meant to apply it to the Fructification, and he has therefore adopted the Errors of LINNEUS and those of my First *Fasciculus*, which subsequent observations under the Microscope enabled me to detect. The vesicles in the Frond have *no reference* to Fructification. The raised conical *Papilla*, with a perforation for the discharge of the ripe seed in the summit, has *no vesicle underneath*; it communicates with the “reticulated *mucus* in which the seed-masses are placed.” (p. ix. x.) The Author, however, in his observations which follow the generic character of FUCUS, details with accuracy its true mode of Fructification, p. 32, 33.—His Second Genus CERAMIVM appears to be a judicious separation of some Species from the *Genera* of FUCUS and CONFERTA, under which by different Authors they have been arranged. It is defined—“Filaments *membranaceo-cartilaginous* somewhat geniculated; ^b capsules with generally one seed ^c scattered on the *outside* of the Branches.” p. 33.—CONFERTA is defined—“Small Tubes, or *herbaceous* filaments with granules of Fructification scattered on the *inside* coats of the Tube.” The substance of the Frond, and the situation of the seed, are here made the discriminating characters; but as there are many of the herbaceous CONFERTA, which have *external* capsules of Fructification, and which are very unlike *F. diffu-*

* The Doctor is not accurate in saying “from the summits.”—Both the surfaces give it out through the *papillæ* together with the *mucus*.

† The *Papillæ* seem to be intended by the Doctor to refer to the prominent tubercles in the fructified summits which have another office: but his observation loses nothing of its force when applied to the superficial *Papillæ*.

‡ “Bemerkungen über das Studium der cryptogamischen Wassergewächse.” Hannover, 1796.

§ This arrangement resembles Professor GMELIN’s, with the addition of N. 2, 3, and 7, as new *Genera*.

|| “*Vesiculæ aggregatæ in substantiâ Frondis nidulantes, poris mucifluis præditæ.*” P. 32.

¶ I have delineated a transverse section of the Frond, Pl. XIII. a.

^a See the beginning of Second Preface, p. ix, and Tab. ix. AA. CC.

^b It might have been expressed positively, as the Structure in all I have examined, where not impaired by Age, is furnished with *septa*, though not visible from the opacity of the Skin.

^c This does not hold with respect to *F. Pinnastroides*, *diffusus*, &c.

fus, *Pinnatroides*, &c. it still seems necessary to constitute an intermediate *Genus*.—*ULVA*, the only remaining *Genus* with which we have any thing to do, * is defined—"an expanded diaphanous membrane with granules of fructification principally towards the margin, imbedded." The existence of seeds in *Genus ULVA* is doubted by Mr. WOODWARD, Linn. Tr. 3. 48, and, if admitted, they are by him supposed to be on all parts of the frond. An ingenious conjecture, however, is offered by Dr. ROTH for their situation near the margin, as these parts decay first, and thereby liberate the imbedded seeds. The definition of ROTH naturally excludes the gelatinous and tubular *ULVÆ* of Mr. WOODWARD. With respect to the seeds, they are supposed by ROTH to have something peculiar about them, as they do not under the highest magnifiers exhibit a regular and appropriate shape, † as is the case with the seeds of the same species in Land vegetables, but seem like cartilaginous Germs, ‡ which require the decay of the Frond to enable them to vegetate. The uniformity of colour with the skin, in which the seeds are imbedded, prevents their being usually discovered.

On revising my Synoptic Table after the lapse of more than Three Years, I beg leave to offer the following Remarks.—*FUCUS*, in a restricted sense, would form a clear and distinct *Genus*, from the structure of the Frond in Dr. ROTH's words, substituting *seriatim* for *aggregata*. § This would include my First Division, with the exception of *F. nodosus*, *filiquosus*, *filiculofus*, and *cæspitosus*.—A Second *Genus* might be formed from those of similar fructification, but different habit of frond. ||—The *Genus*, I had denominated in my Table *CERAMIUM*, is very different from that of Dr. ROTH. Instead of the generic character there inserted, I should wish to substitute one taken from fructification and structure;—skin smooth, glossy, polished on each side, with a colourless *mucus* within; forming together a thick consistent substance, with the seeds very minute, naked, orbicular, of the colour of the skin, disposed in patches, or in lines, just within the surface of the cuticle. ¶ This *Genus*, in polished surface and mode of Fructification, much resembles *ULVA*, and, as *CERAMIUM* has been twice occupied, it may be called *PALMARIA*.—*CHONDRUS* has a fructification that differs from that of any other in its simple state, and wants no alteration: it includes only one Species, *F. crispus* with its varieties: but the mammillous and echinated varieties cannot be included, and indeed in RAY these Species are separately marked.

SPHÆROCCUS of the Synoptic Table, comprising the globuliform *Fuci* of GMELIN, is of course a numerous Family. No alteration is necessary in the Generic Character; but my observations on Fructification enable me to alter the arrangement, and form some new *Genera*. The opaque skinned geniculated Species, *Pinnatroides*, *diffusus*, *Lycopodium*, will arrange under *Genus CERAMIUM* of ROTH. *Pinnatifidus*, and *Osmunda*, have naked imbedded seeds, and belong to *Genus PALMARIA*. *Fastigiatus*, and *radiatus*, with some newly discovered *Fuci* which have been arranged, p. 89, from Fructification, will form a clear and distinct *Genus*. *F. alatus*, *sinu-*

* n. 3.—*BATRACHOSPUMUM* seems, though consisting of not more than 2 Species, to be very judiciously constituted.—n. 7. *RIVULARIA* has never occurred to me.

† The expression in German is difficult to translate: "künstliche zusammengesetzte structur." p. 53.

‡ "Knospenartiger Keime oder Fortsätze (propaginus gemmaceæ)." p. 53.

§ See ROTH, p. 32.

|| "Semina in mucro retiformi in orbem congesta, fronde lævi complanatâ, ramosâ."

¶ "Semina minutissima, orbicularia in maculis irregularibus, vel in lineis in cute, innata; fronde planâ utrinque lævissimâ, mucro intermedio pellucido, membranâ retiformi mucum percurrente."

ofus, and perhaps many of their affinities, whose granules are produced in processes in which they are immersed, are perhaps improperly called tubercled. I have not been enabled from dissection to determine whether they are single seeds or pericarps. In all these Species which have genuine tubercles or capsules, with a hard external coat, the character as Gmelin well observes is clear and distinct. Hist. Fuc. p. 27. With respect to CODIUM, that Genus has been illustrated before from Observations made by OLIVI, p. 258. The increasing lights thrown on this subject will I doubt not soon enable us to establish a more permanent Table of Genera and Species.

Considering the interval which has elapsed since the appearance of my former *Fasciculi*, and that my researches have been continued during that period, it will be proper to notice under each article the result of subsequent Observations.

F. SERRATUS. ——— This Species seems to * fruit all the year: I have found its pods in almost every month. Professor ESPEr has figured it in two Plates, but the size of his Work only admits of the representation of the summits, and his narrow-leaved sort has no fructification.

F. VESICULOSUS. ——— I received from Mr. PIGOTT in July, 1798, specimens of this *Fucus* from AUST FERRY on the R. Severn. They belonged to Dr. WITHERING's 2d. Division. † At this time the plants seemed to be shedding their seeds, and the seed-vessels were covered with an indurated *Mucus*, of a saffron colour, which brought to my mind the remark made by Mr. CORREA DE SERRA; Phil. Tr. 1796. p. 2. Professor ESPEr has figured Two Varieties of this *Fucus*, and likewise *F. inflatus*, the inflation of whose summits I apprehend to be only accidental, and probably preparatory to fructification. ‡ He has given likewise *F. divaricatus*, which in the arrangement below constitutes my 2d. Division of *F. vesiculosus*. The particular time of fruiting of this species is omitted in Mr. TURNER's Calendarium, as supposing it to be at all times of the year. Indeed I have found its seed-pods during all the Summer, and most of the Winter months.

F. DIGITATUS. ——— The *Papillæ* perforated at top are often discoverable in this species, and particularly after the seeds are shed, even in dry specimens; but the seeds are too minute to be observed, unless in the form of small blackish dust, under a high magnifier. With us the stem is undoubtedly solid, § and a transverse slice exhibits concentric circles with a dark pith,

* Mr. TURNER has published a memoir on the times of fruiting of different Species of *Fuci* from actual observation. I shall avail myself of the information it contains in my Table of Synonyms.

† Dr. WITHERING's Divisions of varieties are of use in discriminating the immense varieties (if there are not many kindred Species), which are arranged under *F. vesiculosus*; but as the distinction is taken from the tubercles, as well as the air-vessels, it may be better to reduce and new modify the Divisions in this manner.

Division 1. Bladders in pairs, narrower than the frond; axillary one, solitary, round, or oval.

2. wider than the frond: axillary one triangular. *F. divaricatus*.

3. Bladders irregular; three or more in an oblique direction.

4. Bladders axillary, single; on the frond few or none: in this division, when two branches are near together, the axillary bladders appear in pairs; hence LINNEUS's expression "axillaribus geminis."

‡ This certainly happens in respect of *F. canaliculatus*.

§ ESPEr says "*Innen aber ist er hohl*;" but whether he speaks of the bulb or stalk, it is uncertain; but his expression as to the branching base is very appropriate: "*wurtzeln, die ihn als Klammern zur befestigung an andere Körper dienen*." p. 101. They are certainly not roots, but agglutinated creepers.

or *medulla*. ESPER has given two Drawings, but he has confounded this and *F. bulbosus* together, and made the stem bigger upwards. *

F. BULBOSUS. ——— I have no new Observations to make on this Species. *Papillæ* are much more rare than in *F. digitatus*, but imbedded seed-bearing granules are frequently discernible on dissection in the Knobs on the back of the bulb.

F. SILIQUOSUS. ——— I have found since my former publication, fruiting Pods on Specimens of this Plant very frequently during the Winter months; they are easily to be distinguished by the protuberant *Papillæ*, and the absence of the transverse bars on the outside. The inside is like that of the pods of *F. vesiculosus*. In the months of April and May, they fall off. Professor ESPER has figured it without fruit, Pl. VIII.

F. SPIRALIS. ——— This is well delineated by ESPER, Pl. XIV. I have never seen a bladder on this Species, though doubtless an occasional one may be found. The protuberant olive shape of the terminal Seed-vessels, and their being always in pairs, are infallible characteristic marks. †

F. PUSILLUS. ——— I have since found this Species on the perpendicular rocks at the Pier at St. MICHAELS MOUNT, where it grows in such dense patches as to collect the sand and ooze. The expanded summits, though compressed, appear through the Microscope to be succulent, and when held to the light, of a purple colour, with little blood-coloured granules imbedded.

F. SINUOSUS.—See F. RUBENS, Pl. VII. ——— I have nothing new to notice respecting this *Fucus*. The HUDSONIAN name of *rubens*, under which it is described, p. 18, I here abandon, which was applied by LINNEUS to the *F. prolifer* of LIGHTFOOT; and I here adopt that given by Messrs. WOODWARD and GOODENOUGH. ‡ Professor ESPER, in a very characteristic Drawing, Pl. XLII, has given it as a Variety of *F. Palmetta*.

F. SANGUINEUS. ——— ESPER has given this Species, Pl. XXXVIII, but instead of its usual short stem it has a long one, with leaves set on alternately as on a spray of laurel.

F. PLICATUS. ——— This Species is delineated in ESPER's *Fuci*, Pl. XXXVII, but the principal branches are represented larger than the secondary ones, which I have never observed; and the branches are not sufficiently crooked and entangled.

* There are doubtless many varieties of this Species, as one can hardly imagine so great a mistake would have been committed.

† “*Fructificationes geminæ, terminales, pedunculatæ, oblongæ, crassiusculæ.*” Linn. Sp. Pl. N.B. The figure and situation of the Seed-pods in this Species is particularly to be attended to; they are terminal, and as RAY justly observes, “*breviores et tumidiore quam in priori,*” sc. *F. vesiculosus*. Morison's t. 8. f. 10, is referred to as *F. spiralis*, Linn. Tr. v. 3. p. 148. but an examination of the Figure will discover the error, as the fructification is there represented neither swollen, nor altered in shape.

‡ We owe the rectifying this mistake to the arrival of the *Linnean Herbarium* in England. I had noticed it before, p. xxiii.

F. ACULEATUS. ——— The representation of this Species in ESPER'S ICONES does not resemble the habit of the growing plant. Few Specimens preserve their Base: In the Collection of COL. VELLEY I noticed two perfect Plants: the base was very small in proportion to the Stem.

F. SACCHARINUS. ——— Attending more minutely to the fructification of this Species, I found in the Winter months that conical *Papillæ*, with a perforation at top, were visible on many specimens. Some, which I gathered, February, 1799, had shed their seeds, and the apertures had widened considerably: the seeds, as supposed, were adhering to the outer coat of the Frond, but so small as to be discoverable only as dust, with high magnifying powers. * PROFESSOR ESPER has figured this Species in two Plates, but they afford no Idea of our † Gigantic Var. α , Pl. IX. On examining some recent Plants, I discovered that the thick welted part in the middle of the frond serves the purpose of, and may be considered as, a midrib. It branches off on each side in beautiful undulations, from the main stem, like the veining of leaves.

F. NODOSUS. ——— PROFESSOR ESPER has delineated this Species in a characteristic manner, though manifestly from a dried specimen, not in fructification. This generally takes place late in the Autumn, or in the Winter months, and like those of *F. filiquosus*, when fully ripe, they drop off; which is the reason that they are rarely, if ever, found during the Summer Months.

F. LOREUS. ——— The above Author has given two Plates with representations of parts of this Species: Pl. XIX, part of the summit; Pl. XXXIX, the *Radices Calycares*, as he calls them, or *Peziza-shaped Bases*. He has collected a variety of Synonyms, but those referring to *Ulva pruniformis* seem out of place, as appears by GUNNER'S Descrip. p. 2. p. 89, and by ESPER'S IC. p. 82.

F. FILUM. ——— There are singular mistakes with respect to this species committed by PROFESSOR ESPER. His Pl. XXI, which he calls *F. filum*, Linn. Syst. Nat. p. 717, adding as a Synonym the *Lagerstroem. Amæn. Ac.* 259. n. 53—the Indian Grass, which is now known to be an animal Production, is in fact the representation of a Chinese Land Plant. On the contrary, his Pl. XXII, which he calls *F. tendo*, Linn. is certainly *F. filum*, Linn. His Plate represents several coming up from a common Base. In that respect, as well as in size, *F. filum*, Linn. differs from the Species delineated in this Work.

F. TAMARISCIFOLIUS. ——— Nothing has occurred in addition to the ample account given of this Species—the *F. ericoides* of LINN. TR. For the mistakes concerning this *Fucus*, see what has been observed under *F. selaginoides*, p. XXVIII.

* Probably every Specimen has not perforated *Papillæ*: some may produce their seeds imbedded in the outer skin, and others in the *mucus* of the sinuous furrows where LIGHTFOOT discovered them.

† A specimen of the largest size, and likewise a fructified specimen, are deposited in the Library of the LINNEAN SOCIETY. It is 6 feet long by 9 inches wide.

F. OSMUNDA. ——— This is given by Professor ESPEr, Pl. LXII, in 6 elegant and appropriate figures, * though its affinities *F. pinnatifidus*, var. α, β , tab. XI of this Work, which are so common with us, are omitted. I mentioned that the fructification is internal in *F. Osmunda*, p. 48. I have however had opportunities lately of seeing this Species more fully fructified, and have delineated a summit, Pl. XVI. c, cc. the seeds are deeply imbedded in the frond, and when mature they drop out, and as the inside is pellucid, the cavities left by the seeds falling out appear like holes. This circumstance arises from the skin being very thin and tinged with purple; very probably in the thick-skinned opaque *Fuci*, such as *F. palmatus*, *edulis*, &c. a similar fructification may obtain without the skin being penetrated through.

F. LACERUS. ——— The Examination of the LINNEAN *Herbarium* has enabled me to correct an error. The Plant delineated and described by me under this Title is one of the sportive varieties of *F. crispus*.

F. STELLATUS. ——— This is likewise another variety of the LINNEAN *F. crispus*: they were both described by RAY as separate species. In HUDSON and LIGHTFOOT they appear as varieties of *F. ceranoides*. I have lately received a specimen from CORNWALL, which was more bulky and echinated than my specimen, Pl. XII: indeed it was crumpled and twisted into a ball; but the summits, on examining them, appeared *mammillose*, so as to leave no doubt of its being a variety of *F. crispus*. The Specimen and Drawing will be presented to the LINNEAN SOCIETY.

F. EDULIS. ——— Professor ESPEr has likewise omitted this *Fucus*, which I formerly observed agrees in some respects with *F. dulcis*, Gmel. I am not sure it is the same plant.

F. PALMATUS. ——— Of this *Fucus* I am persuaded there are several species, to be separated hereafter by attention to fructification. I have in my possession one specimen, thickly garnished with imbedded orbicular cavities with a raised margin. This I shall present to the Society: its fructification is given, Pl. xv. They seem many of them to contain one central seed. In younger leaves of the same specimen, patches of very minute orbicular granules are to be seen. † A var. if not a new species, of a thin texture and an olive colour, without any pedunculated leaves, or *cilia*, at the edges, is to be met with at SIDMOUTH in DEVON.

F. CÆSPITOSUS. ——— I received some beautiful specimens of this species from Mr. PIGOTT, collected near the Mouth of the River SEVERN: the tips were inflated, and had projecting perforated, conical, *papillæ*.

F. CORNEUS. ——— I delineated Var. β , of Linn. Tr. 3. 181, as the only *F. corneus* I had met with. The learned Authors of the Dissertation on *Fuci* enumerate three Var. intimating the almost endless gradations of kindred Plants which had occurred to them in their researches. But, however, with respect to the Line to be drawn between Mr. HUDSON's *F. corneus*,

* N. 4, seems to be a *Pinnatifidus*.

† See Pl. xv. k, ll—m, n.

his *Pinnatifidus* and *Filicinus*, I think the two latter are clearly discriminated by their succulent and almost gelatinous texture from *F. corneus*, which is cartilaginous. Professor ESPEY, Pl. LXIII, has given *F. corneus* with the habit of *F. crispus*, Linn. though he quotes GMEL. Pl. XIV. 3. a very different species. Messrs. GOODENOUGH and WOODWARD, on the contrary, omit GMELIN's *F. corneus*, and quotes his *F. spinosus*, Pl. XVIII. f. 3. I incline to think they are right in their conjectures; but this species requires further elucidation. *F. spinosus*, GMEL. *F. pectinatus* and *ptilotus*, GUNNER, *F. nereideus*, LIGHT. and *F. corneus*, NER. BRIT. are nearly allied Species.

F. CRISPUS. ——— Professor ESPEY has figured *F. rubens* of the *Linnean Herbarium*, under the Hudsonian name—*F. crispus*; and he has referred to GMELIN's t. XXI. f. 1. which, though called by him *F. ciliatus*, certainly is *F. laciniatus*.

F. THRIX. ——— I have made no further Observations on this Species, which seems more properly to belong to *Genus ULVA*, and will arrange under the division of *Ulvæ* in Mr. WOODWARD's Catalogue (Linn. Tr. p. 3. p. 51.) U..., *subgelatinosæ; fronde tereti, tubulosâ*. *

As Professor GMELIN has given a Chemical Analysis of two Species of *Fucus*, differing very greatly in their texture, I thought it would be gratifying to my Readers in the present advanced state of Chemical Knowledge, to procure a Friend to undertake the office of analyzing likewise two Species; especially as I had an opportunity of having it done in my own Neighbourhood from Plants of my own direction, by a Gentleman who possesses a considerable share of merit as a Chemist. The whole † process is subjoined, and will complete what I have to offer on the

K

Phyfiology

* *Fucus Byssoides*, the only omitted *Fucus* of the Linn. Transf. Catalogue, is too decidedly an *Ulva* to be admitted.

† **FUCUS VESICULOSUS.** ——— 500 Grains of this *Fucus Vesiculosus*, being exposed to a red heat for 3 hours, in a coated glass retort, connected with a receiver and pneumato-chemical apparatus; produced 267 cubic inches of air, which being agitated for some time in lime-water, 137 cubic inches of carbonic acid were absorbed.

The remaining 130 cubic inches contained, by the test of sulphuric acid, 39 cubic inches of oxygen.

The 91 cubic inches that remained, and which burned with a blue flame, were mixed at different times with known quantities of oxygen, and successively exploded in a glass tube, by means of the electric spark.

They were now reduced to 10 cubic inches, which proved to be azotic gas, (as it instantly extinguished a lighted candle) mixed with a small quantity of carbonic acid gas, which was formed in the deflagration, by the union of a part of the carbone, contained in the hydro-carbonate, with the oxygen.

There came over into the receiver 228 grains of an almost transparent liquid, that had a strong smell of ammonia, and produced copious white fumes when it was held near an open vessel containing muriatic acid, and also a thick brown fetid empyreumatic oil, which swam on the surface of the above liquor, and weighed 54 grains.

The above 228 grains were diluted with distilled water, saturated with muriatic acid, and filtered; and being gently evaporated, there remained in the vessel about 300 grains of muriat of ammoniac. 90 grains therefore were ammonia, and 138 grains water, including the weight of a small quantity of carbonic acid gas, disengaged from the ammonia by the addition of the muriatic acid.

The charry residuum in the retort, weighed 136 grains; this was exposed in a crucible to a heat gradually raised to redness, when the charcoal was consumed, the saline mass that remained weighed 50 grains, and was of a dark brown colour; but after being exposed to the air for a few hours, it changed to a very dark green colour: its solution in hot water was also of a green colour; but when it was cold, it became perfectly limpid, and had a strong smell of sulphuric acid.

To discover the quantity of sulphur it contained, diluted nitric acid was added, till the effervescence ceased; it was then filtered, and the deposit on the filter washed with a large quantity of distilled water. A dark grey powder remained on the filter, which being dried, weighed 6, 5 grains. When this was exposed to a gentle heat in a small porcelain crucible, it burnt with a sulphureous flame: when the deflagration ceased, the crucible was made red hot: what remained weighed 2 grains. It was of a light reddish brown colour, and proved to be flex, mixed with a small quantity of iron; as muriatic acid digested on it, gave a blue precipitate with the prussic acid.

Physiology of GENUS *Fucus*. The result under the Retort of two common Species, the one succulent, the other coriaceous, must appear surprising: the one containing five-sixth parts of water, the other not quite one-fourth part: * the one containing only 82, 5 cubic inches of different gases, while the other yields 267 ditto. The Soda in the former was little more than half the quantity of what was found in the latter, and the empyreumatic Oil not more than one-ninth, or six to fifty-four. It will be unnecessary for me to extend my observations on these comparative *Analyses*. I cannot, however, conclude without observing, that from the above statement it clearly appears that, contrary to the generally received opinion among Farmers, the coriaceous Species are preferable as manure to the succulent ones. With

50 Grains of salt, made by carefully burning the weed, were digested for an hour in hot distilled water, and frequently agitated; it was then filtered. A residuum of a dark lead colour weighing 17, 5 grains was collected on the filter: this, being thrown into a crucible, heated nearly to redness, burnt for a very short time, with a sulphureous flame: after being made red hot, it weighed 15, 8 grains, and was of a light brown colour.

The above filtered liquor, was divided into three equal parts.

One part being supersaturated with nitric acid, was left 24 hours in the glass, at the end of which time, a precipitate was formed, which weighed about 1 grain, and proved to be sulphur.

The second part was gently evaporated in a glass vessel, and left 11 grains of a greyish saline substance, which I found to be soda united with the sulphuric, muriatic, and carbonic acids. To discover the proportion of the two first acids; to the first part of the liquid after the separation of the sulphur, nitrat of silver was added till it no longer formed a precipitate: it was then filtered, and the muriat of silver when washed and dried, weighed 13, 5 grains, which contain about 2, 2 grains of real muriatic acid.

The third portion of the liquid was supersaturated with nitric acid: after the sulphur was carefully separated, nitrat of barytes was added as long as it produced a white cloud: the sulphat of barytes when washed and dried, weighed 4, 5 grains, one third of which 1, 5 grains is sulphuric acid.

The above brown earthy residuum weighing 15, 8 grains, were found to consist of magnesia 14 grains, silice 1, 5 grain, and iron 0, 3 grain.

500 Grains therefore of the *Fucus Vesiculosus*, consist of the following substances:

		Grains.
Water	.	138.
Ammoniac	.	90.
Charcoal	.	86.
Empyreumatic oil	.	54.
Soda	.	18, 5.
Magnesia	.	14.
Silex	.	1, 5.
Iron	.	0, 3.
Muriatic acid	.	6, 5.
Sulphuric ditto	.	4, 5.
Sulphur	.	4, 5.
Carbonic acid gas	137 Cubic Inches.	60.
Oxygen gas	39	13.
Hydro-carbonate gas	81	2.
Azotic gas	10	3.
	267.	495, 8.
		Loss 4, 2.
		500.

F. DIGITATUS. — I treated 500 grains of the *Fucus Digitatus* exactly in the same way, and with the same degree of heat, as the *Fucus Vesiculosus*. It yielded 82, 5 cubic inches of air; 48, 5 cubic inches of which were azotic gas, 23 oxygen, and 11 carbonic acid gas.

In the receiver was a yellowish coloured liquid, which weighed 427 grains, and a few drops of a thick fetid empyreumatic oil, which sunk in the liquid, and weighed 6 grains.

The residuum in the retort weighed 38 grains.

The yellowish liquor did not change the colour of the acidulated, or common tincture of litmus: nitrat of silver and acetat of lead dropped into it, formed no precipitate. It proves therefore to be pure water, holding a small quantity of empyreumatic oil in solution.

The saline mass left by burning the 38 grains of coal that remained in the retort, weighed 24 grains, and was found to be composed of the following substances: Magnesia 3 grains, silice and iron 0, 5 grains, muriatic acid 9 grains, sulphur 1, 5 grains, and soda 10 grains.

Contents of 500 Grains of the F. DIGITATUS.

		Grains.
Water	.	427.
Charcoal	.	14.
Soda	.	10.
Muriatic acid with a very small quantity of sulphuric acid	.	9.
Empyreumatic oil	.	6.
Magnesia	.	3.
Silex and iron	.	0, 5.
Sulphur	.	1, 5.
Azotic gas	48, 5 Cubic Inches	14, 5.
Oxygen gas	23.	7, 5.
Carbonic acid gas	11.	4, 5.
	82, 5.	497, 5.
		Loss 2, 5.
		500.

RIVIERE, near HAYLE, CORNWALL.

RICHARD EDWARDS.

* This must arise from the great quantity of mucus this succulent Species, *F. digitatus*, contains within its external Coats.

With respect to preserving Specimens, in addition to what I observed before, * I beg leave to state, that the larger kinds, both coriaceous and succulent, after previous soaking and clearing off the Flustra, &c. which may be facilitated either by soap or acids, should, after a day or two of moderate pressure, according to the circumstances of the case, be brushed over with oil of turpentine, in which there is a slight solution of Gum Mastic, or Oil varnish from the shops; by which, under judicious management, the gloss which they have, when taken out of the water, may be perfectly imitated.

I have just been favoured with an account of Professor ESPEr's Third *Fasciculus*, and beg leave to offer the following remarks on the Species it contains. Pl. LXIV, *F. lactuca*; this is *F. edulis*, Ner. Brit. Pl. LXV, *F. acinarius*, foreign: Pl. LXVI, *F. natans*, ditto: Pl. LXVII, *F. filicinus*; this is not a British variety: Pl. LXVIII, *F. confervoides*—very different from *F. confervoides* of this work, or of the Linn. Tr. N.B. *F. confervoides* of HUDSON and GMELIN seem from description to be *Conserva verticillata*, which is *F. hirsutus* of ESPEr, not *F. rudis*: see my Observations, p. 97. Pl. LIX, *F. corniculatus*; foreign. Pl. LXX, *F. canaliculatus*; a variety of *F. crispus*. N.B. the channelled frond is very apt to mislead unexperienced Botanists. In the true *F. canaliculatus*, it prevails through the whole under side of the frond up to the fructifying summits; while in many of the varieties of *F. crispus* the stem is rolled in at the edges, and gives the appearance of a furrow. Pl. LXXI, *F. volubilis*; foreign. Pl. LXXII, *F. spiralis*; this is rather a variety of *F. vesiculosus*. Pl. LXXIII, *F. canaliculatus*, var. this is another variety of *F. crispus*, but with the segments very narrow. N.B. The remark I have made on *F. canaliculatus* in the Appendix, viz. that the summits have two rows of perforated *papillæ*, if attended to, will prevent future mistakes. Pl. LXXIV, *F. caprinus*; this Plate is a mixture of *F. edulis* and *F. palmatus*. Pl. LXXV, *F. rubens*; this is *F. palmatus*. Pl. LXXVI, *F. carnosus*; a Specimen of *F. edulis* discoloured. Pl. LXXVII, *F. compressus*; foreign. Pl. LXXVIII, *F. uvarius*; taken from JACQUIN's *Collectanea*. It is the *F. sedoides* of Ner. Brit. and Linn. Tr. the *F. ovalis*, Hudf. and *Vermicularis*, Gmel. Pl. LXXIX, *F. marginalis*; foreign. Pl. LXXX, *F. Pseudo ceranoides*; not supposed to be a *Fucus*. Pl. LXXXI, *F. sericeus*; foreign. Pl. LXXXII, ditto, ditto. Pl. LXXXIII, *F. vesiculosus*; var. Pl. LXXXIV, ditto. Pl. LXXXV, *F. concatenatus*? Pl. LXXXVI, ditto, ditto. Pl. LXXXVII, *F. fruticulosus*, JACQ.

On observing the mistakes made in the above Catalogue, it is impossible not to lament the imperfect state of knowledge respecting marine plants, which seems to prevail even where the greatest pains have been taken. The almost endless variety of habit in different specimens of the same Species is in a great degree the cause of it, as conclusions are formed from a very few, and frequently from single specimens, remote from the place of their growth. I cannot take leave of this subject without expressing a well-grounded hope from my attention to this *Genus* at the sea-side, and through all the changes of seasons, as likewise from my having visited all the considerable collections of *Fuci* in this Island, and compared specimens and drawings of specimens with each other; that this Work will prove a means of fixing Marine Botany on a more secure Basis, as scarcely a single specimen has been described without adverting to its Fructification, which has been submitted either in a recent, or moistened state to an investigation under the Microscope.

LECTORI.

INSPECTIS Herbariis antiquis, et hodiernis ferè omnibus, quæ in **ANGLIA** reperiuntur, **FASCICULUM** hunc tertium **FUCOS** omnes littorum nostrorum Indigenas complectentem in lucem emitto. Intervallum temporis, ex quo **FASCICULUS** secundus prodierit, minimè perfectioni operis obfuturum, imò quam maximè profuturum, ex investigationibus et itineribus hâc de causâ susceptis spero equidem ac confido. Quæ in hoc temporis intervallo patefacta sunt in Præfatione Anglicâ paullò fusiùs annotavi; flagrante adhuc Bello, auctoque super modum Chartæ pretio eadem hæc Latinè explicare super-vacaneum forè duxi: quamquam quis est apud exterarum gentes vel modicè Rei Botanici peritus, qui Anglicè nescit?

F U C U S SERRATUS. TAB. I.

FUCUS. fronde plana, dichotoma, ferrata, ad apices tuberculata. *Linn. Syst. p. 811.—Sp. P. 1626.—4. Hist. Ox. 3. 648.—Bast. l. 6. p. 120.—Light. 902.—With. Bot. arr. 3. 242.—Huds. 176.—R. Syn. 42.—Gmel. 57.—Aët. Gall. 1711. p. 285. et pars 2^{da} 1772.*

RADIX irregularis, subtus plana, agglutinata.

CAULIS nodosus, cartilagineus.

FOLIA, plana, punctata, bifurcata, costâ intermediâ.

A. FRUCTIFICATIO.

Masc? Vesciculæ glabræ in Fronde ordine regulari immerfæ, ad oras fibrosæ.

Fæm? Vesciculæ glabræ, terminales vel laterales, in fructum mucosum congestæ.

O B S E R V A T I O N E S.

PLANTA hæc, omnium vulgatissima, ferraturis foliorum facillè dignoscitur. E basi subrotunda, faxis adherenti, ad altitudinem pedalem, vel supra, affurgit. Habitus, dichotomus, et divaricatus: latitudo foliorum varia, rarò autem uncialis; membranâ ex utrâque costæ parte, penicillis fibrosis, ordinatim dispositis instructâ. Penicilli hi, si microscopium adhibeas, oras urceolorum feminalium amplectuntur. Incunte hyeme, ut observavi, summitates foliorum turgescunt, tuberculis per totam superficiem nullo ordine glomeratis, humore tenaci superfusis. Vascula hæc quoque urceolos referunt, fibris tamen ad oras omninò destituta. Observandum est Linnaeum essentialem *Fuci* characterem monœcium esse velle, qui quidem character generi universo, ut nunc saltèm ordinatur, minimè convenit, villi etiam in hac specie *extus* apparent, non “*intus sunt aspersi.*” L. Gen. Pl. p. 569. Color Plantæ fuscus et in quibusdam olivaceus; juxta basim, niger; fructus maturus sub-luteus. Et si fructus granulatus *incipiens* in plantis adultis omni ferè tempore conspiciatur, rarò tamen maturescit, et, ut suprâ notavi, nunquam nisi ^a hybernis mensibus. Tunc quidem intumescit fructus, et penè totus gelatinosus et subdiaphanus evadit, vesculis prominentibus humore tenaci et liquido superfusis.

Hab. ad rupes passim.

^a Quoddam simile evenit in plantis quamplurimis Cryptogamicis.

SERRATED F U C U S, PL. I.

O R

S E A W R A C K.*

FUCUS. frond flat, forked, with a midrib; ferrate-toothed: fructifications terminating, tubercled.

* I have added the old English name of *Sea Wrack* in conformity with LIGHTFOOT. It originally comprehended the marine plants indiscriminately, in the same manner as ALGA among the Ancients.

“Projecta vilior Alga.”

P L A T E S.

Hist. Ox. xv. 9. 1.—*Bast. op. t.* 11. *f.* 3.—*Act. Gall.* 1711. . 9. *f.* 10.—*ib.* 1772. T. 3.
f. 1, 2, 3, 4, 5, 7, 9.—*Velley's Inqu.* T. 1. (*opt. Fruct. fœm.*)

ROOT, irregular, swelling from the base of the stem, flat at bottom.

STEM, cartilaginous, knobbed.

LEAF, flat, forked, punctured, mid-ribbed.

FRUIT, pitcher-shaped or ovate vessels: Male and Female distinct.

O B S E R V A T I O N S.

THE serratures sufficiently distinguish this plant, which stands at the head of the Genus in the *Species Plantarum* of LINNÆUS, and is, perhaps, the most universal among them. The leaf appears dotted on each side of the mid-rib; these dots have pencils of whitish hairs. With the assistance of glasses these dots appear to be *urn-shaped* or rather *semi-ovate vessels*, deep immersed in the substance of the leaf and empty at top; their rims fringed with *shining, fibrous, glass-like threads*. Towards Winter the upper parts of many of the principal leaves, which through the Summer had shewn incipient fructification, grow *turgid*, and appear covered with *tubercles*; they are now mucilaginous, and the colour alters to a dirty yellow. On examining these tubercles with a glass, they appear of the same shape as the former, bellying out at bottom, and contracted at the mouth, and overflowing with a *clear mucous fluid*. As one part only of this plant assumes this appearance, it seems highly probable this is a *monœcious* plant; the ^a pencilled dots being probably the *male*, and the mucous tubercles the *female* fructification.^b These plants, when lying in water, convert it speedily into a ^c *thick liquor*, which probably is generated on the surface and may serve to convey the impregnating particles from the vessels on each side of the mid-rib, to those clustered together at the extremities.

Lightfoot says the Dutch prefer this species, as being destitute of mucous vessels, for preserving their crabs and lobsters. He likewise says it does not abound so much with lixivial salts as the other species. However this and all the larger kinds serve a very beneficial purpose exclusive of the rich manure they afford; as they are converted by a slow process by fire into KELP, which is an essential ingredient in the making of glass.

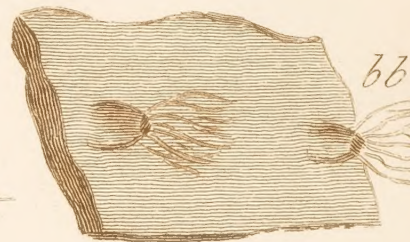
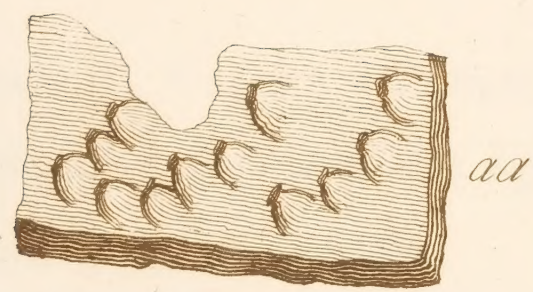
- a.* A fllice of the ripe tubercle with the imbedded female vesicles. *a. a.* The same magnified.
b. A fllice of the frond with the pencilled vesicles. *b. b.* The same magnified.
c. Seeds highly magnified.

Hab. common on Rocks, below High-Water mark.

^a See the note in the English Preface, and the fortuitous coincidence of opinion in some respects between the Author and a celebrated French Naturalist. p. 111.

^b My Friend, Major Velley, has accurately drawn the tubercled summit of this plant (PL. 1.), but not considering it as monœcious he has omitted the pencilled vesicles.

^c There are many circumstances attending the fruiting of these plants, which are yet undiscovered, the Tamarisk-leaved F. emits at the summits a fluid, which is of a faint bluish purple. As this is one of the *bladder* Fuci, and consequently agreeable to my Theory *monœcious*, may not the oleaginous fluid, in conveying the impregnation, cause this appearance?



FUCUS VESICULOSUS. TAB. II.

FUCUS. fronde dichotoma, integra; caule medium folium percurrente, vesiculis sparsis, fructu marsupii-formi, laterali, granulato.

(Vide notulam Obs. Angl. subjectam.)

RADIX, orbicularis, subtus plana.

CAULIS cartilagineus, margine lacero.

FOLIA dichotoma, costata, punctata.

VESICULÆ aeriferæ nullo ordine ex utrâque costæ parte, axillaribus *solitariis*.

A. FRUCTIFICATIO.

Masc ? In interiore vesicularum grandiorum parte.

Fœm ? Vesiculæ rotundiusculæ, apice perforatæ, muco superfusæ, connascentes.

OBSERVATIONES.

PLANTA, cujus iconem exhibuimus vesiculis aeriferis ex utrâque costæ parte, præsertim sub axillis, instructa est; quarum pars interior fibris intertexta, et tuberculis lævibus, floris masculi, ut videtur, fungitur vice.^a Per maturitatem producit fructus *lateralis* granulatus, gelatinosus, bicornis, è basi angustâ sensim sese dilatans. Libet ergo cum cl. LINNÆO suspicari speciem hanc quoque monœciam esse. Observavimus quoddam simile in Fuco nodofo, filiquoso, &c. minimè autem in ceteris quamplurimis ejusdem familiæ.

In æstuariis, et vadis ubique occurrit hæc species, una cum, plantis congeneribus; nec mirum si per tot horas in ficco relictæ proprius habitu terrestribus accedant, quam quæ sub aquis perpetuò submerguntur. Margines foliorum rarò undulati, nunquam ferrati, occurrunt: substantia, ut in priore, coriacea; altitudo pedalis, vel suprâ. Notandum est varietates hujusce Fuci quamplurimas occurrere, inter quas tanta est affinitas, ut vix notatu dignæ sint; quæ autem fructu, et vesicularum ordine constantè inter se discrepant, ut species distinctæ, potiùs quam varietates, contra Gmelini sententiam, ut opinor, recensendæ sunt; sin minùs, emendanda est descriptio LINN. “vesiculis axillaribus *geminis*,” quæ etiam in systemate Gmelini occurrit.

In tabulâ D. VELLEJ fructificationem F. vesiculosi exhibente, apices frondis, utpote in F. ferrato, fructiferi sunt, unde cuivis faciliè apparebit *differentias essentielles* saltem quoad fructum variis hujusce Familiæ *Speciebus*, vel si mavis *Individuis*, inesse.

Hab. in rupibus passim.

^a Et si frons punctata sit, ut in F. ferrato observavimus, vesiculas tamen immerfas, nunquam adhuc observavi, sed fibrarum solummodò pennicillos, adeò ut conjicere libeat interiorem vesicularum aeriferarum partem, urceolorum vice fungi. Vide sectionem vesiculæ apud D. Velley prorsus singularem. t. 1. fig. 3. Res tamen adhuc in incerto est.

BLADDER FUCUS, PL. II.

OR

SEA OK.

FUCUS. frond, flat, forked, with a mid-rib running through the centre; bladders imbedded without order on each side, and in the angles of the branches: Fructification lateral, granulated, purse-shaped.*

(No specific Plate.)

ROOT as in the foregoing species.

STEM cartilaginous, naked, with the membrane lacerated.

LEAF mid-ribbed, dichotomous, straddling.

BLADDERS, oblong, smooth, *not in pairs*.

A. FRUCTIFICATION.

Masc? Bladders reticulated on the inside with fibres and tubercles.*Fem?* Roundish vessels, collected together in a purse-shaped gelatinous fruit.

OBSERVATIONS.

THERE seem to be many varieties of this common plant, and the Linnæan character of "Bladders in pairs" may lead to confusion. This is a characteristic of some, but by no means of all the varieties. In the plant under consideration the air-bladders are found in various parts of the leaf without any determinate order. On cutting open these bladders, whitish, shining fibres are visible to the naked eye surrounding the inner coat, and there are likewise some tubercles discernible in the ^a inner substance of the coat of the bladder. At a more advanced state a compressed, granulated fruit makes its appearance, *laterally* near the top, which resembles in some sort a pouch drawn together with the bottom upwards. On considering these different parts of fructification, the Swedish Naturalist was, I think, well-founded in considering it as ^b *monœcious*: a character, however, which, as I noted in *F. ferratus*, obtains only in a few species. Lightfoot observed that the air-bladders at the angles of the branches were often single (p. 904.), which may be the case in many varieties, but not in this. The bladder situated there often assumes a *triangular* heart, or rather a compressed shape. The size of this plant seldom exceeds a foot in height; the breadth of the leaves about one inch. Its texture thick and leathery, and the shape of the bladders elliptic. The fructification of this species so much resembles the different parts in Pl. 1. that I have not thought it necessary to delineate them.

a. A seedling plant.

Hab. common on rocks.

* I have not given the references to Authors in their place, but shall add them at the end of this Note. The received opinion is, that this species varies in an endless manner. In the course of my observations I have made out two or three sorts that appear *constant to their kinds*. I shall describe them with specific characters in the course of this Work. If I could fix on a specific plant for LINNÆUS's specific character I should call this plant var. (α), and the plant Pl. v1. var. (β), but in fact the species with a *constant pair of "axillary bladders"* I do not remember to have met with. This remark relates to *F. vesiculofus* in a restrained sense; when modern Authors refer *F. divaricatus*, *spiralis*, and *inflatus* to this species, it seems to be confounding every idea of specific character. I shall only remark in general that as these plants are produced from seeds, and as the distinguishing characters are *in their fructification*, it is not philosophical to huddle together plants which differ so essentially in those sexual parts.

Fucus vesiculofus. Linn. 1158, 1380.—Huds. 466, 576.—R. Syn. 40.—Bauh. Pin. 263.—Lob. ic. p. 252.—Gmel. 1156.—Park. 1293.

^a See an accurate delineation of this process in Major Velley's *Tab. 1. f. 3.* which clearly shews the air-bladders to be intended for some *other purpose* than mere buoyancy.

^b LINNÆUS, who had so vast a field before him, could not be expected to attend minutely to the *cryptogamous plants*. Having seen a monœcious appearance in some of the larger plants, he inferred its belonging to the whole genus.

F. Virens



C. L. del.

FUCUS DIGITATUS.

TAB. III.

FUCUS. fronde palmata, foliis ensiformibus; stirpe tereti. *Linn. Syst. Nat.* 815.—*Ger. Em.* 1570.—*Huds.* 579.—*Lightfoot.* 935.—*With. Bot. arr.* 3. 244.—*Ray. Syn.* 46.—*Imperati. Hist. Nat.* 741. *Fuco giganteo.*

RADIX fibrosa, divaricata, valida, cornea.

CAULIS cylindricus, longus, fursum attenuatus, baculi magnitudine.

FOLIUM, amplum, crassum, enerve; laciniis, prælongis, ensiformibus.

FRUCTIFICATIO—vesiculæ irregulares, nullo ordine, in cutis superficie?

OBSERVATIONES.

SPECIES hæc, congenerum ferè maxima, et, ut Raius aptè dicit, “arborea,” radicibus validis in fissuris rupium, aut inter lapillos in argilloso maris fundo infixæ, vim fluctuum sustentat. Caulis, in quibusdam baculi magnitudinè, validus, tenax, rotundus, solidus; cutis, seu mavis cortex crassus, coriaceus, Fucis tenerioribus Ulvis, et Confervis undique obfitus. Summitas caulis in folium^a peramplum illicò se repandit, laciniis plurimis longissimis, ensiformibus. Mira hujusce Fuci varietas, quoad magnitudinem et longitudinem caulis, ut rectè observavit D. Lightfoot. adeò ut minimè mirum sit, si plures sint species; fin minùs, verisimile est capita ad justam magnitudinem in junioribus provenire, caules autem tardè crescere, et non nisi provectâ ætate perfici. Substantia folii, crassa admodum, glabra, enervis, pellucida, et, ut ait Gerardus (p. 1570.) edulis. Fructificatio, à nemine adhuc, ut scio, observata, in vesiculis tenuibus continetur, quæ quidem variæ magnitudinis et formæ in foliorum superficie producuntur: liquor intus gelatinosus sine granulis conspicuis. Notandus hic error D. Raii, Syn. p. 47. qui Fucum *polyphyllum* DODDII, varietatem, vel juniorem saltèm plantam hujus speciei esse existimat, quum potiùs, si ex descriptione libet conjicere, palmati varietas, recensenda sit. Et reverà specimen F. palmati prope *Harvicum* reperti, qui cum plantâ *Doodianâ* in omnibus convenit in herbario D. Woodward. conservatur, ut ipse nuperrimè mihi mandat.

Hab. juxta Weymouth sparsim; in littoribus Cornubiæ, copiosissimè.

^a Raius in Synopsi Fucum hunc Balteiformem appellat. p. 46.

FINGERED FUCUS,

PL. III.

OR

Sea Hangers.

FUCUS. frond hand-shaped, segments sword-shaped; stalk cylindrical. *Linn. Syst. Nat.* 815.

P L A T E S.

Fl. Dan. 392.—*Gunn.* 1, 3.

D

ROOT

ROOT branching, spreading, horny.

STEM round,* solid, elastic, tapering upwards.

LEAF very broad, swelling from the top of the stem suddenly, ribless, fleshy, of a shining polish.

FRUCTIFICATION in thin vesicles of various sizes on the surface of the leaf—*rare*—without any apparent granulation.

O B S E R V A T I O N S.

THIS is one of the most common Fuci on the Western Coast, and, being a bulky plant, forms an essential article of the Husbandman's attention after a storm. Its strong fibrous roots insinuate themselves into the larger crevices of rocks, and amongst the pebbles in the stiff ooze, lumps of which are wafted ashore with it. Ray calls this, and the Furbelowed F. "*Tree-like*," and indeed its firm elastic stem is capable of performing the office of the trunk in trees, and supporting, with the assistance of its native element, its wide expanded foliage. The size of the larger stalks is equal to that of a walking-stick, solid, elastic, coated with smooth thick bark, which is generally beset with smaller sea plants. These stalks taper pretty much towards the top, when they suddenly expand into leaves of a foot or more in breadth. This leaf or head is divided into a number of segments (from four to twelve, *Lightfoot*), tapering to a point. The stem of this Fucus is as incorruptible as a cabbage-stump. A very singular circumstance will strike the observer of this plant, viz. that among individuals, whose heads are nearly equal in size, the stalks will be found to vary from the size and height of a walking-stick, to that of a little finger; whether these are varieties, or junior plants, whose leaves first attain their size, is at present uncertain. The substance is thick and ribless. The fructification I should think rare, as not being noticed. It consists of thin inflated pellicles of various forms produced without order on the surface. The mucus within had no apparent granules. This plant is of a rich brownish yellow colour when fresh, and appears as shining and smooth as if it had been varnished.

a. a. a. The vesicles filled with mucus.

Hab. on the shores at Weymouth, and on all the S. Coast, but largest and most plentiful towards the Western extremity of the island.

* Mr. Woodward suspects this plant may sometimes have a cavity in the stem.

F U C U S POLYSCHIDES.

TAB. IV.

FUCUS. fronde palmata, foliis ensiformibus, radice tuberosa, cava; stirpe plana marginibus plicatis. *Lightfoot. Fl. Sc. p. 936.—Gmel. p. 202.—Reaumur. Act. Gall. 1712. p. 21.—Huds. 579.—With. Bot. Arr. 3. 244.*

RADIX magna, tuberculata, cava, depresso; fibris cartilagineis subtus.

CAULIS, latus, compressus, ad margines plicatus.

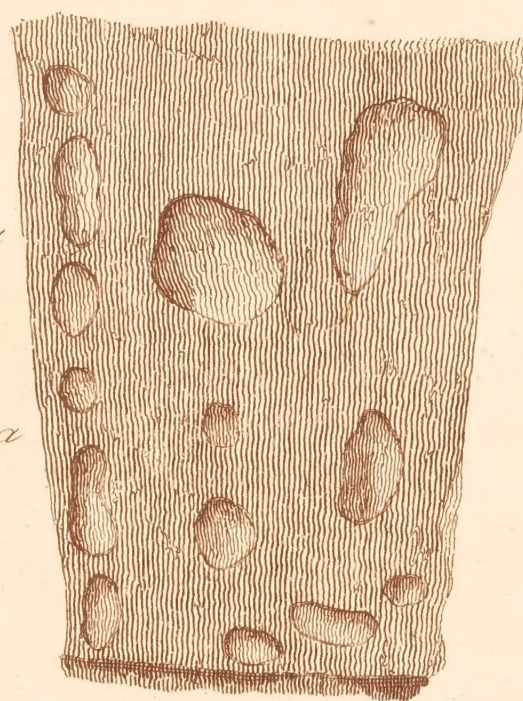
FOLIUM, amplum, segmentis numerosis.

FRUCTIFICATIO—Vesiculæ per superficiem foliorum nullo ordine dispositæ?

OBSER-



F. Digitatus



O B S E R V A T I O N E S.

SPECIES hæc, à LINNÆO non descripta, in occidentali Angliæ parte frequens reperitur. Bulbus, rapi maximi magnitudine, in centro depressus, concavus, externè verrucosus, radices plurimas rigidas, tortuosas, ex imâ parte in fundum maris uliginosum, vel inter lapillos emittit. Caulis, amplus, compressus, centro modicè crassus, marginibus, præsertim juxta basim, mirè fimbriatus est. Altitudo caulis bipedalis, vel supra, est; summitate illi- cò in folium dodrantali latitudine sese repandente. Folium, seu mavis caput plantæ, peramplum segmentis plu- rimis prælongis, lævibus, crassis, enervibus.

Sub nomine “ Fuci arborei ” species hæc à Raio cum Fuco digitato confunditur, etsi caule, et radicibus toto cœlo differunt. Mira enimvero, ut ait D. Lightfoot. tanti viri hallucinatio! Observandum est caules duos, trefve persæpè ex bulbi summitate provenire, et adeò immensa est moles plantæ ut quandoque vix humeris susti- nenda sit. In profundo maris oritur; in uliginosis, ut libet conjicere; et, uncunque piscibus alendis, vel prote- gendis inferviat, post procellas tamen in littore haud inutilis projicitur. Fucus hic, qui à Gmelino palmatus, ab Hudsono satis aptè bulbosus, vocatur, una cum F. digitato, F. palmato, F. saccharino in occidentali Ang- liæ parte stercoreis vice fungitur. In insulis Cassiteridum quoque Sal Kali Kelp vulgò dictum lento igni ex iis- dem conficitur.

Hab. in Devonix et Cornubiæ littoribus.

FURBELOWED F U C U S, PL. IV.

O R

Great Furbelowed Hangers.

FUCUS. frond hand-shaped; leaves sword-shaped; root, tuberous, hollow; stalk flat, plaited at the edge. *Lightfoot.* 936.

P L A T E S.

Gmelin. f. 30.—Reaumur. Aët. Gall. f. 1.

ROOT very large, hollow, flattened, studded with warty excrescencies, pushing strong, horny, fibrous roots from beneath.

STALK flat, broad, thick in the middle; much furbelowed at the edge.

LEAF, very wide at top: segments very long, sword-shaped (from 6 to 30).

FRUCTIFICATION, thin, irregular bladders?

OBSERVATIONS.

O B S E R V A T I O N S.

It is remarkable, that this immense plant, which is produced in such quantities on the Western Coast of England, as to afford a valuable article of manure, should have escaped unnoticed by LINNÆUS, and the older Writers, and that Ray our countryman, who must have seen the Cornish shores at least covered with it, should have paid so little attention to it, as to confound it with *Fucus digitatus*. Hudson, in his second edition, has introduced it under an apposite name—Bulbous-rooted; and Gmelin has figured it under the title of *F. palmatus*, a term pre-occupied by another species, and which does not so properly accord with a leaf cut into many segments. From a large *oblongo-oblate*, knobbed, hollow bulb arises, generally, one; sometimes two, or even three compressed stalks, four inches, or more wide, thick in the middle, thinner at the edges, where it is strangely ^a furlowed, and contorted. This stem, which is upwards of two feet long, suddenly expands into a very wide head, which is afterwards divided into numerous sword-shaped segments. The weight of the whole is immense: its substance semi-transparent, totally free from veins or fibres, and covered with a coat of varnish. Its colour is deep brown. It is to be observed that the bulb sends forth numerous strong horny roots, which strike deep into the ooze, or lay hold of the stones in the larger crevices of the rocks—a circumstance necessary to enable so bulky a plant to resist the violence of the waves. I have not yet seen it in fruit; but there is little doubt, from its affinity to *F. digitatus*, that the fructification is in similar vesicles. In the Scilly Islands, and on some spots in the West of Cornwall, this species, with the other large succulent ones, are burnt in considerable quantities to make KELP.

a. The bulb and part of the stem, natural size.

b. An entire plant reduced.

Hab. on the Devonshire and Cornish Coasts, plentiful, (at Icolmkill, Scotland. Lightfoot.).

^a This very strong ruffle at the rim of the stalk seems to be for the purpose of stiffening it, and enabling it to bear up in water its very large flowing head.

F U C U S SILIQUOSUS. TAB. v.

FUCUS. fronde compressa, ramosa; foliis distychis, alternis, integerrimis; fructificationibus pedunculatis, oblongis, mucronatis. *Linn. Sp.* 1629.—*Syst. Nat.* 813. *Seb. Th.* 11. *p.* 186.—*Gmel.* 81.—*Lightfoot.* 921.—*With. Bot. arr.* 3. 236.—*Ray. Syn.* 48.—*Hudf.* 574.

RADIX, orbicularis, subtus plana.

CAULIS, compressus, cartilagineus, prælongus.

FOLIA, nulla.

FRUCTUS, pedunculatus, mucronatus, transversim filiquæ ad instar fulcatus.

F. Polyschides



OBSERVATIONES.

Fucus hic in longitudinem cubitalem extenditur, ramis paucis, prælongis. Caulis compressus, undulatus, tenax, glaber, uniformis: folia, ut vocantur, distycha, variæ in diversis individuis magnitudinis, adeò ut species diversæ videantur. Minus accurata tamen LINNÆI descriptio respectu foliorum, reverà enim, *Fucus* hic ramis, et filiquis solummodò constat. Siliquæ enim immaturæ foliorum vice funguntur; maturæ, turgescunt, transversim extus fulcatæ; intus, in loculos dispositæ; fibris numerosis, albis, splendentibus è basi ad verticem extensis. In *Fucis* præcedentibus, ferrato sc. et vesiculoso, fibrosam et gelatinosam fructificationem à se remotas, et disjunctas notavimus, in hac autem specie *apparent* conjunctæ; mucus enim, vel gelatina, cavitatem filiquæ, fabæ in leguminosis domicilium, sibi vindicat,^a fibris per medium transcurrentibus, ut in icone videre est. Siliquarum rostra in longum sæpissimè protenduntur. Vesiculas feminales in gelatina à D. Lightfoot. notatas nunquam adhuc inveni; mucus quippe omni tempore pellucidus et sine granulis conspicitur; verisimile ergo est fructificationem fœmineam, vel in rostris filiquarum, vel in summitate plantæ inesse; aut saltèm feminula, vel in fibris, vel etiam in muco, parvitate suâ aciem oculorum effugere. Color olivaceus, ficitate niger.

Hab. in profundo mari juxta Weymouth, et in littoribus Devonix et Cornubiæ.

^a Siliqua bissecta longitudinalitèr.

PODDED FUCUS. PL. v.

FUCUS. frond compressed, branched; leaves pointing two ways, alternate: Fructification on footstalks, oblong, sharp-pointed, (beaked). *Linn.* 1629.

P L A T E S.

Ger. em. 1569. f. 7.—*Seb. Th.* t. 95. f. 3.—*Fl. dan.* t. 106.—*Gmel.* t. 2. B. *Giseke.* t. 75.

ROOT, swelling out, flat at bottom, adhering.

STEM, smooth, shining, compressed, zig-zagged.

LEAVES, o.

PODS on long footstalks, sometimes with very long snouts, barred across, with cavities inside, and fibrous, filken threads stretched across.

OBSERVATIONS.

THOUGH LINNÆUS and subsequent Authors give leaves to this plant, it is in reality without them. The pod-like fruit, which comes out thick on each side of the stalk, in its younger state is flat, and without swelling, and has the resemblance of leaves. This was noticed by Lightfoot, and my observations fully confirm it. The sporting of Nature is remarkable in this plant: she here produces so perfect a *Legume*, that one would expect on opening it to find a fruit: yet notwithstanding there are the requisite cavities, there is no *bean* within. The fibrous fructification, which prevails in the foregoing, is observable in this. Many silky, white filaments are extended quite across the cavities from the base to the summit. There is a clear liquor within on first cutting open the pod, but no thick mucilaginous matter, as in the fruit of the preceding species, nor have I been able to dis-

cover the “feminal vesicles” mentioned by Lightfoot. p. 922.^a This is one of the most trailing of the *Fucus* kind. I have picked it up four feet long, the stalk compressed, undulating in a zig-zag direction, and nearly uniform in size throughout. The individuals of this species vary exceedingly in the length and breadth of their pods; so much so, as almost to induce the belief of the existence of two separate kinds. It is to be observed that the pod has frequently a footstalk nearly as long as itself, and a long extended beak of a similar length, blunt at the tip; so it should have been called *rostratus* instead of “*mucronatus*.” Vid. sup.

Hab. Adheres by its flat base to rocks in deep water. Weymouth, and on the Devon and Cornwall Coasts, plentiful.

^a In a correspondence I have been favoured with from Mr. Woodward, I find that he has searched in vain for granulations, or seeds, in this species. It may happen, that this plant matures its seeds in the Winter months; if not, as the general habit strongly indicates its affinity to the Oak-leaved, and Knobbed Fuci, the granulations must be searched for in the long extended beak of the pod, or in some of the shorter pods near the summit of the plant, and it is not unlikely that the *mucous* liquor may have invisible seeds, as I suspect to be the case in the vesicular tumours on the leaves of the *F. digitatus*.

F U C U S SPIRALIS.

TAB. v.

FUCUS. fronde dichotoma, integra, caule folium percurrente, infernè nudo, vesiculis verrucosis terminalibus. *Linn. Sp. Pl.* 1672.—*Ger. em.* 1570.—*Morif. hist. Ox.* 1. 15.—*Bast. l.* 6. *p.* 120.—*Lightfoot. p.* 911.—*With. v.* 3. *p.* 242.

RADIX, irregularis, subtus plana.

CAULIS, cartilagineus, nudus, dichotomus.

FOLIA, integra, coriacea; costâ medium cujusque percurrente.

FRUCTIFICATIO, mucosa, granulata, ovata, terminalis; bina, ternave.

O B S E R V A T I O N E S.

SPECIES hæc ubique, ferè, permixta fucis congeneribus, vesiculoso sc. nodofo, et inflato reperitur. Habitu et texturâ parùm differt à *F. vesiculoso*; vesiculæ tamen aere inflatæ ^a *nunquam* occurrunt in folio. Caulis dichotomus folium percurrit, infernè nudus, membranâ utrinque, per ætatem, aut forsan vi fluctuum, primùm lacertâ, dein penitùs deficiente. Juxta basim caulis foliola plurima, ut in *F. vesiculoso*, nascuntur; incertum plantæ suffulciendæ, an reparandæ, inservientia. Folia ordine dichotomo, marginibus integris, apice bifurcato, producuntur. Habitus plantæ spiralis, unde et nomen à LINNÆO inditum, etsi minimè sit character essentialis hujus speciei; *Fucus* enim, volubilis, *F. inflatus*, et, quandoque etiam, *F. vesiculosus*, variè sese contorquent. Ex apice foliorum oriuntur fructus bini, vel terni, oblongi, ovati, granulis intus in muco repleti, oleas conditas figurâ, et colore referentes. Folia levitèr punctata ex utrâque costæ parte, ut in *vesiculoso*, et congeneribus; punc-

^a LINNÆUS fructificationem gelatinosam in hac specie, utpote in *F. vesiculoso*, minus aptè *vesiculas verrucosas* nominat.



F. spiralis.



F. villosus.



a

tulis, five penicillis fibrosis,^b ut æquum est suspicari, partem fructificationis masculam continentibus. Observandum est Gerardum species duas tresve *in eâdem plantâ*, i. e. ex eâdem radice provenientes, designasse, p. 1567. n. 4. auctorem, quoad fucos, minimè omnium fidendum.

Fructificatio vitro subjecta urceolos, seu vesiculas rotundiusculas, apice perforatas, ut observavimus in *F. ferrato* et *F. vesiculoso*, exhibuit. Vid. partes fruct. *F. ferrati* (Tab. 1.), ex fronde descriptas, et ope microscopii depictas.

Hab. in æstuariis et ad rupes in occidentali Angliæ parte.

^b Vid. Obf. in *F. ferratum*.

SPIRAL FUCUS. PL. v.

FUCUS. frond flat, forked, very entire; the stem pervading the leaf, naked at bottom; fructifications in pairs, terminating, tubercled. *Linn. Sp. Pl.* 1672.

P L A T E S.

Fl. dan. 286.—*Bast.* ii. 1.

ROOT, swelling, roundish, flat at bottom.

STEM wire-like, naked, twisted, dichotomous.

LEAVES, mid-ribbed, dotted, entire, edged, twisted, forked at top.

FRUCTIFICATION in pairs (sometimes 3 together) terminating.

O B S E R V A T I O N S.

NOTWITHSTANDING Gmelin considers this species, as well as *volubilis*, *inflatus*, *divaricatus*, and some others under the general name of *F. vesiculofus*, yet there can be no doubt of their being distinct kinds; if it only depended on the absence of the air-bladders, which I think I have shewn to be parts of fructification. LINNÆUS has denominated it *spiral*, from its being often found with its leaves twisted, which is by no means an appropriate character. It arises from a flat base with wire-like stalks, naked, and destitute of the membrane on each side, branching, dichotomous. The leaves are long, waved, entire at the edge, dotted, and forked at the tips. Near the base the stalk is garnished with a cluster of small stiff leaves, either as a support to the plant in the absence of the air-bladders, or to assist its re-production when torn off by the waves. The fruit comes out in pairs, and sometimes three together, at the summits; it is oblong, granulated, filled with mucous matter, and of the colour of the preserved Spanish olive. The punctures, immersed in the leaves in a regular series, being garnished with pencils of fibres, though not so conspicuous as in *F. ferratus*, are supposed to contain the male fructification in this species. It is seldom so tall, as represented by Ray. *Syn.* 41. nor have I ever seen the stalk *channelled* as LINNÆUS observes, which very likely is another species. As the parts of fructification resemble those of *F. ferratus*, it was judged unnecessary to delineate them.

Hab. On the Devon and Cornwall Coasts, on rocks below High-Water mark.

FUCUS

FUCUS VESICULOSUS.

TAB. VI.

(V A R. β .)

FUCUS. fronde dichotoma, costata, integerrima; vesiculis undique ex adverfo binis; axillari solitario; fructu tuberculato, terminali.

(Vid. Observ. in F. vesic. p. 3.)

RADIX orbicularis, subtus plana.

CAULIS, cartilagineus, marginibus laceris, foliolis juxta basim.

FOLIA, undulata, vesiculis binis oppositis.

FRUCTIFICATIO terminalis, tuberculata.

OBSERVATIONES.

VARIETATEM alteram Fuci vesiculosi à priore (p. 3.) longè diversam subjicimus. Character essentialis F. vesiculosi apud LINN. constat vesiculis binis axillaribus, qui quidem character nequaquam Fucis hujus speciei nostratibus, quoad hætenùs observavi, obtinet. Vesculæ in hac varietate *constantèr* ex opposito binæ producuntur (non sparsim, ut in priore), glabræ, ovatæ, numerosæ. In axillis autem foliorum, seu potiùs, in ramulorum dichotomiâ, vesculæ occurrunt *solitariae*, irregulares, figuræ persæpè triangularis. In ceteris, ut videtur, species hæc cum Linnæanâ convenit; bini enim ad apices occurrunt fructus, mucosi, granulis intus repleti, adeò ut necesse sit tres saltèm species distinctas constitui. Habitus, præcedenti, utpote et F. vesiculoso LINNÆI, totis partibus minor. Conchæ affixam invenimus, ut in icone videre est. Vesculas aerias, seu masculas, in substantiâ folii fibris intus instructas observavimus, figuræ etiam penè orbicularis sunt, non ovatæ, ut in F. vesiculoso (Tab. 2.).

Hab. ad oppidum SIDMOUTH, in Devonîâ.

OAK-LEAVED FUCUS.

PL. VI.

(V A R. β .)

FUCUS. frond flat, forked, with a mid-rib throughout; bladders in pairs opposite; between the branches, solitary fruit vessels in pairs terminating.

(No specific Plate.)

ROOT, orbicular, flat at bottom, adhering.

STEM cartilaginous, naked, wire-like.

LEAVES flat, forked, mid-ribbed; air-bladders opposite.

FRUCTIFICATION, granulated, terminating in pairs.

OBSER-

O B S E R V A T I O N S.

THIS variety differs essentially from the preceding one (PL. II.), and from the *F. vesiculofus* of the later editions of LINNÆUS. In the first edition of the Species Plantarum, p. 1158, and in the Flora Laponica, and Suecica, the axillary bladders in pairs are not noticed,^a but as it occurs in the Systema Naturæ, and in the later editions of the species, we may suppose it the result of accurate observation on the plants in the Northern Seas. In the species under description, the air-vessels are produced in pairs *exactly opposite* on each side of the mid-rib; are more turgid and crowded than in the preceding, and the whole plant is much more diminutive in size. Instead of *lateral* purse-shaped, or horned fruit, as in *F. vesic.* PL. II. the feminal vessels are produced in pairs at the *summits* of the leaves; they are oblong, granulated, and full of *mucus*. On cutting open the air-vessel, the same fibrous fructification appeared, as in the kindred plants. It is more than probable that future investigation will detect many more species nearly allied; at least, with respect to this, and *F. vesic.* PL. II. as the difference lies in the *parts of fructification*, and is so well defined, it can never be proper to subscribe to the opinion of Gmelin, who thinks they are merely accidental varieties.^b This specimen was found growing on a Limpet, which it had buoyed up, and wafted ashore, so that it was in a perfect growing state.

Hab. SIDMOUTH, *Devon.*

^a The fructification is likewise improperly termed by LINN. “Warty bladders,” whereas the hollow in the inside is inconsiderable, the whole substance being a *granulated thick mucus*.

^b See the note on *F. vesiculofus*.

F U C U S M E M B R A N A C E U S. T A B. VI.

FUCUS. fronde dichotoma, membranacea, pellucida; costata ramulis, et foliolis sparsim è costâ erumpentibus.

(*Species nova.*)

RADIX, plana, orbiculata, agglutinata.

CAULIS dichotomus, cartilagineus, subnudus.

FOLIA, membranacea, dichotoma; caule medium folii percurrente, prolifero.

FRUCTIFICATIO, in punctis glomeratim dispositis.

O B S E R V A T I O N E S.

SPECIES hæc, ut suspicor, rarissimè occurrit, nec à quopiam, quoad scio, adhuc describitur. In incerto plantarum marinarum statu, dubitare fas est, annon inter Ulvas, potius quam inter Fucos recensenda sit; præfertim si recentiores Botánicos consulamus: ulvæ enim species temporibus nostris tripliciter saltem auctæ sunt, et D. Woodward nuperrimè, ut mihi mandat, partitiones plurimas constituit, quarum una *carpophora* est. Habitus omninò fucorum, qui “*dichotomi frondescentes*” appellantur; substantia autem, si ita dicam, prorsus *ulvacea*. Apices foliorum bifidi, vel etiam trifidi; fructificatio penè singularis: microscopio subjecta, è centro punctulorum ex utrâque costæ parte producuntur aciculæ acutæ, incurvæ, singulæ, vel binæ, transversim, fasciis

ciis rubris, et albis notatæ. Color pallidè luteus, tenuitate membranæ in aquâ prorsùs evanidus. Altitudo totius plantæ pedalis circiter, latitudo folii rarò uncialis. E costâ folium percurrente, oriuntur folia, et persæpè etiam ramuli, sicut in *F. hypoglossò* dicto. (Vid. Act. Linn. v. 2.). Fructificatio, à D. Woodward. nuperrimè vitro vis magnæ subiecta, *Confervas* nascentes exhibuit, adeò ut aciculæ supradictæ minimè pro partibus fructificationis reputandæ sint, quæ, ut videtur, feminulis congestis, et ordinatim dispositis ex utrâque costæ parte, conflant. Costa folii ficcitate rubescit.

Hab. ad oppidum SIDMOUTH in Devonîâ, juxta Promontorium occidentale.

PELLUCID FUCUS. PL. VI.

FUCUS. frond thin, transparent, mid-ribbed, dichotomous, forked, punctured on each side the rib; leaflets and branches coming out of the *midrib* of the frond.

(*An undescribed species.*)

ROOT, roundish, flat at the bottom, agglutinated.

STEM, wire-like, cartilaginous, naked.

LEAF, thin, membranaceous, pervaded by a mid-rib, punctured, regular.

FRUCTIFICATION, in clusters of regular dots.

OBSERVATIONS.

THE membranaceous, pellucid texture of this species should rather cause it to be classed as an *Ulva*; at least, when the *Genera* shall be better ascertained, it will be found not to be a *Fucus*. If we take the strict Linnæan character of *Ulva*, viz. “a simple membrane without leaf or stem,” the numerous tribe so much increased of late will be much diminished. But it seems better to relinquish the *mere membrane*, and to adopt other distinctions from texture and fructification united, as has been successfully attempted by Mr. Woodward, who has arranged them in separate divisions, as he has just informed me. I have reason to think this species is rare; being probably a native of deep and still waters, the delicacy of its structure may prevent its coming ashore perfect. In size and habit it resembles the larger *dichotomous Fuci*. The leaves are regularly dotted, which being viewed in a microscope exhibit a singular appearance. From the centre of the dots arise one or two crooked needle-like substances, tapering to a point, which towards the summits are barred across with white and red. The powers of my glass were insufficient to prosecute my researches any further into this singular appearance. The regular situation of these dots forbid the idea of their being *Flustra*, or any minute marine insect, and may, on more accurate investigation, cause this plant to be arranged as a genus by itself.

This plant having been submitted to the investigation of Mr. Woodward, he has favoured me with a letter, in which he says, that by means of a strong eye-glass he has discovered those needle-like substances to be infant *Confervæ*, and has no doubt but the clusters of dots, which constitute the spots regularly arranged on each side the mid-rib, are the real fructification.

Hab. SIDMOUTH, Devon. August, 1794.

FUCUS

F U C U S FASTIGIATUS.

TAB. VI.

FUCUS. fronde filiformi, dichotoma, ramosissima, fastigiata, obtusa. *Linn. Syst. Nat.* 815.

Hudf. n. 7.—*Light.* 930.—*With.* 3. 257.

..... fronde filiformi, dichotoma, ramosissima, acuminata. *Linn. ib.*—*Hudf. n.* 25.—

Light. 932.—*With.* 258. *var.* β. —*R. Syn.* 45.—*Morif.* 648.—*Bauh. Pin.* 366.

RADIX, fibrosa, implicata, cartilaginea.

CAULIS, teres, dichotomus, tenuis.

RAMULI, teretes, ad basim tenues, apicibus vel furcatis vel prælongis, acuminatis.

FRUCTIFICATIO, lateralis, vesiculosa, rugosa.

O B S E R V A T I O N E S.

APICIBUS longis, acutis, filiquarum æmulis, quosdam individuos hujus speciei, necnon alios furcatis, obtusis, brevibus, ex eadem radice sæpè videre est. Speciminibus inducti, LINNÆUS, et plerique nostrates Botanici, species duas constituere: radix, si ita vocetur, fibrillis intertextis conficitur; quæ, etsi plantæ inter lapillos figendæ inserviant, tamen ipsæmet sæpè numero caulescunt. Ramuli subtus graciles, fursum grandiores, per dichotomiam ramosissimi, et longitudinis æqualis, summitatibus quasi in scopas congesti sunt. Apicibus mirè illudit hæc planta; oblongis, sc. tumidis, acuminatis, unde nomen "*lumbricalis*," Hudfoni; et obtusis, brevibus, *bi*, *tri*, vel *quadrifariam* furcatis. Altitudo varia; sæpè dodrantalis, et aliquando vix triuncialis; color etiam varius; viridis, fuscus, olivaceus, ruber; et quandoque ex eadem radice. Manipuli fati amplius post procellas in arenâ projiciuntur. Fructificationem, ut in icone repræsentatur, frequentè observavimus, in apicibus acuminatis, nunquam adhuc in furcatis. Juxta summitates è latere erumpunt vesiculæ, tumidæ, rugosæ, mucò repletæ, et per maturitatem dehiscentes. Cum tam dissimiles inter se sint ramuli, æquum est conjicere cum D. Woodward. *With. Bot. Arr.* 258. plantam hanc monœciam esse.

Hab. passim.

FORKED F U C U S.

PL. VI.

FUCUS. frond thread-shaped, forked; very much branched, of the same length, blunt. *Linn.*

Syst. Nat. 815.—*Hudf.* 588.

..... frond, thread-shaped, branched; tips worm-like, long, acuminate. *Linn. ib.*—

"*Lumbricalis.*" 589. *Hudf.*

P L A T E S.

Fl. Dan. 393. 419.—*Gmel.* 6. 1. 2.—*Hist. Ox.* 15. 2. 9. 1. 4.—*Velley. Inq. Tab.* 4.

ROOT

ROOT fibrous, entangled, cartilaginous.

STEM, round, slender, dichotomous.

BRANCHES, cylindrical, biggest at top, equal lengths; some forked, others worm-like.

FRUCTIFICATION, lateral, near the top, vesicular.

OBSERVATIONS.

THIS plant has two appearances so very different, that LINNÆUS, and subsequent Botanists have constituted two distinct species, under the names of *F. fastigiatus*, and *F. furcellatus*, for the latter of which Mr. Hudson has adopted the expressive name of *F. lumbricalis*. The great singularity attending this species is its root, which appears a congeries of implicated, horny fibres, which supply the double purpose of fixing the plant, and supplying fresh branches when Age or Accident have robbed the parent of its first offspring. These fibrous parts seem to be in a continual state of advance towards branching. Large masses grow together, and the tips appear with the pod-like; the forked, (either 2, 3, or 4 times); or the plain varieties: often in the same mass; but more frequently, the whole cluster appears similar. There is likewise no less variety in size, and colour; varying from nearly a foot to 3 inches, and exhibiting every tint of the brightest grass green, olive, brown, red, and purple.

The fructification, as far as it has occurred to me, resides in the long worm-like tips, but we have authority to say the forked ones are likewise fruitful, which makes me apprehend this plant is *monœcious*. Lightfoot and Gmelin have discovered fructification in the forked tips, and likewise annular projections, which probably form diaphragms. The size and shape appear in the drawing: they are vesicular, wrinkled, and burst open when ripe.

a. a. a. The lateral fructification bursting out and splitting lengthways.

b. b. The same in the smaller specimen.

Hab. common.

FUCUS PUSILLUS.

TAB. vi.

FUCUS. fronde cæpitosa, repenti, ramosa; foliis spathulatis; junioribus obtusis, provectoribus bi-vel tri-furcatis.

(*Species non descripta.*)

RADIX, subtus plana, faxis agglutinata.

CAULIS, rotundus, repens, implicatus.

FOLIA, spathulata, (apicibus, aliis rotundis, aliis furcatis) enervia, minutula.

CÆSPES totus in nudo saxo licheniformis.

OBSER-



J. S. del.

O B S E R V A T I O N E S.

PARVITATE suâ, ut opinor, adhuc inobservata permanfit species hæc; etfi nil mirum fi minimè fit vulgata; fimul enim; idque in rupibus arenaceis, juxta SIDMOUTH in Devoniâ oblata est. Fucum pygmæum D. Lightfoot. primo aspectu refert, sub-nigra sc. et crustacea; vitro aucta pallidè rubet. Cæspes totus mirè implicitus, rupes, Lichenis, vel potiùs Jungermannia ad instar, operit. Caulis, tenuis, et subrotundus in tres vel plures ramulos dividitur, juxta basim foliolis linearibus obfitus. Folia sensim sese dilatant, apicibus, vel rotundis, vel furcatis. Fucus totus cartilagineus est, et enervis. Haud mirum, fi plerique Botanici Fucum hunc, pygmæo mole saltèm affinem, observantes accuratiorem indagationem evitaverint, et forfan species permultæ pufillæ, *licheniformes*, adhuc latent; crustaceam enim unam in stirpe F. digitati, Licheni foliaceo fimilem in occidentali Angliæ parte detexi, incertum an Fucus, an fit potiùs Corallinæ species. Hic quoque minimè prætereunda species à D. Lightfoot. observata, sub nomine F. repentis. p. 961. et à Dillenio inter Muscos conscripta. p. 50. t. 10. f. 9. A, B, C, D. à me ad oppidum *Tenby* in WALLIA frequentèr reperta. Etfi multis numeris major fit, faxa prærupta, et vi fluctuum opposita fimili modo operit. ^a Articulis dividitur, fimili modo ac F. articulatus, differt tamen texturâ tenaci admodum et corneâ, necnon fibrillis ad genicula. Fructus adhuc latet. Distinctio inter F. pygmæum et pufillum cuivis fati obvia occurrit. Fucus enim pygmæus *erectus*; F. pufillus, *repens* reperitur.

Hab. ad oppidum SIDMOUTH, in Devoniâ. Aug. 1794.

^a Vid. Observ. in F. articulatum.

DWARF F U C U S.

PL. VI.

FUCUS. frond matted, creeping, branched; leaves *spathula-shaped*; sometimes round at top, at other times with two or more forks.

(*New Species.*)

ROOT flat at bottom, agglutinated.

STEM round, creeping, matted.

LEAVES *spathula-shaped*; sometimes forked, those near the root linear.

PATCHES on the rock resembling *Lichens*.

O B S E R V A T I O N S.

NICE examination will evince this plant to be different from Lightfoot's *Pigmy Fucus*, though to a common observer it might pass for that plant. However, as I never met with it but once, and that on no common stone, it may not prove a common plant. The *habitat* I have ascertained, is the soft, crumbling, red sandstone at SIDMOUTH in Devonshire. It grows in blackish patches, which are closely matted together. The substance rigid, and horny: on holding it to the light, it appears of a pale red. On separating a plant from the cluster, it

appears branched from the root, the lower parts of the branches garnished thick with linear *cilia*. These trailing branches towards the end, produce leaves of a *spathula-shape*; when young, round at the tips; when advanced, forked, and divided into 2 or more sharp horns. No fructification has yet been discovered, in which case, however, should it be found to have the remarkable hollow on the top, noticed by Lightfoot in the pigmy *Fucus*, p. 965, and which links it with the *Genus LICHEN*, we probably may set it down only as a variety of that species, which is very frequently to be met with, and may be sportive in its form. I have no doubt but many more minute species will be hereafter discovered. The general growth of these two diminutive species appears to differ essentially; the Pigmy being *erect*, the Dwarf *creeping*.

a. a. a. Clusters of plants natural size.

b. A single plant natural size.

c. The same magnified.

Hab. at SIDMOUTH, in *Devonshire*.

F U C U S RUBENS.

TAB. VII.

FUCUS. frondibus membranaceis, oblongis, undulatis, sinuatis; stirpe tereti. *Linn. Sp. Pl.* 1630.—..... ramosâ. *Linn. Syst. Nat.* 816. *F. crenatus*.—*Gmel. p.* 184.—*Huds.* 475. 573.—*Lightfoot.* 946.—*With.* 3. 235.

RADIX, è basi caulis intumescens, subtus plana.

CAULIS, teres, ligneus, ramosus.

FOLIA, pedunculata, costata, fibrosa, foliolis è costâ.

FRUCTIFICATIO ad margines foliorum, et per totum caulem ciliatim disposita.

O B S E R V A T I O N E S.

PLANTA hæc una cum *F. sanguineo*, cui quidem videtur affinis planta, foliis fibrosis, ut in arboribus, donatur. Substantia foliorum tenuis admodum, et pellucida: variat multum ferraturis foliorum, quæ persæpè in lacinias abeunt. Prolifera est ubique, et foliolis, non modo ad caulem cingitur, sed etiam ad costam, et nervos foliorum. Habitus prorsus singularis, et tenuitati plantæ accommodatus; membranâ enim folii vi fluctuum abrasâ, costâ folii in ramulum vertitur, foliolis plantæ renovandæ inservientibus, instructum. Idem observavimus in *Fuco sanguineo*, sed ^a *perrarò* ita tamen ut affinitati, quam suprà notavimus, stabiliendæ valeat. Forma foliorum oblonga, crenata, undulata: haud rarò ad extremitates occurrunt lacinie irregulares admodum. Elegantissima est species, et vi tempestatum minimè accommodata, adeò ut *perrarò* integra, et illæsa reperiatur. Fructificationem in ciliis marginalibus observavit D. Lightfoot. notandum, tamen, est minùs accuratam esse descriptionem ciliorum tenuium fructificantium. p. 944. Reverà species hæc fructûs tempore fimbriata, potiùs quam ciliata,

^a Idem observavit D. WOODWARD. sed rarissimè.

apparet, adde etiam caulem undique fructificatione obfitum. Nuperrimè tantum; menſe ſc. Februario ſpecimina quam multa fructu copioſiſſimo mihi oblata ſunt. Forma fructûs vitro auſta, oblonga, pellucida, granulis tribus, aut quatuor coccineis intûs.

Hab. ad oppidum WEYMOUTH, ſparsim; in occidentali Angliæ parte, nec non in Walliâ, copioſiſſimè.

RED FUCUS.

PL.VII.

FUCUS. frond membranaceous, oblong, waved, indented; ſtalk round, branched. *Linn.*

P L A T E S.

Fl. dan. 552. — *Gmel.* 24. 1.

ROOT ſwelling from the bottom of the ſtalk.

STEM, round, woody, branched.

LEAVES, on footſtalks, mid-ribbed, veined, crenated, often laciniated.

FRUCTIFICATION, at the edges, on the leaves and on the ſtalks; oblong clear veſſels with blood-red ſpots.

O B S E R V A T I O N S.

THIS is a moſt beautiful ſpecies, and very accurately deſcribed by Lightfoot, p. 943. Its texture is delicate, and the leaves veined as in trees: the edges are toothed or crenated, from whence it had the name of *F. crenatus* given it by Gmelin. The colour is fainter than in *F. ſanguineus*, having often greeniſh and olive tints. The form of the leaf is variable, as it often becomes in a manner palmated at the tips. The ſtalk is branched and extended, and garniſhed throughout with leaves of every ſize, but chiefly ſmall ones; and the ſame is obſerved in the mid-rib, and even in the ſmaller veins of the leaves; a mode of vegetation which I have never obſerved in any other plant. The *F. ſanguineus*, which is nearly allied, has ſometimes ſome ſmall leaves on the mid-rib of the leaf, but I have obſerved it very rarely. It ſhould ſeem that this peculiar mode of producing leaves is to answer ſome peculiar end in the œconomy of this plant. The membrane, being ſo extremely delicate, in all probability, ſoon vaniſhes either from the force of the waves, or the bite of inſects, while the mid-rib and ſtronger veins remain as branches, which are in this manner provided beforehand with a crop of incipient leaflets. Its fructification is beautiful, and I rather think rare. The edge of the leaf becomes richly fringed, as likewiſe the branches; the *cilia* either ſwell or totally diſappear, and the little blood-red dots deſcribed above are viſible with the commoneſt magnifier, and ſometimes with the naked eye.

a. Part of a leaf magnified.

b. Part of the ſtalk with the fructification.

c. The ſame magnified.

d. A mucous veſſel with the imbedded granules.

Hab. common.

* See the Latin note.

FUCUS

FUCUS SANGUINEUS.

TAB. VII.

FUCUS. frondibus membranaceis, ovato-oblongis, integerrimis, petiolatis; caule tereti, ramofo. *Linn. Syst. Nat.* 815.—*Mantiff.* 136.—*Morif.* 645.—*R. Syn.* 49.—*Gmel.* 185 *Hudf.* 573.—*Lightfoot.* 942.—*With.* 3. 235.

RADIX, intumescens, subtus plana.

CAULIS, ligneus, brevissimus, ramosus.

FOLIA ampla, oblonga, obtusa, fibrosa, margine integro.

FRUCTUS pedunculatus, subrotundus.

OBSERVATIONES.

MAGNITUDE et pulchritudine foliorum *F. sanguineus* palmam obtinet inter plantas submersas. Perrarò autem illæsus, et integer, imo vix unquam, nisi penitus dilaceratus, observandum nobis sese præbet. Diebus Halcyoniis quærenda est hæc species; membrana enim folii, quavis cuticulâ tenuior, simplici maris æstu facillimè dirumpitur. A formâ foliorum *Lapathi sanguinei marini* nomen olim obtinuit. Caulis brevissimus in tres vel plures ramulos statim è radice dividitur, ligneus, nodosus, atro-rubens. Folia, pauca, ampla, oblonga, costâ, et nervis donata, producuntur; color rosaceus; in quibusdam, ut nomen indicat, sanguineus; aliquando etiam gilvo variegatus. Foliola ad costam folii, ut in *F. rubente*, quandoque sed perrarò occurrunt. D. BORLASE, in Hist. Cornubiæ, *F. sensitivum* appellat; folia enim exsiccata, tacta manu recedunt, et vi quâdam elasticâ trepidant. Fructificationem adhuc nunquam observavi; ^a juxta radicem, vel potius basim folii, fructum orbicularem, pedunculatum nigrum detexit Cæderus, Fl. Dan. t. 349. Idem observavit D. Hudson. 573. In hoc quidem differt à *F. rubente*, qui, quando est fructifer, omnium apparet fecundissimus.

Hab. præcipuè apud DAMMONIOS.

^a D. Woodward. mandat mihi fructum pedunculatum à se in costâ folii reperiri.

DOCK-LEAVED FUCUS.

PL. VII.

FUCUS. leaf membranaceous, egg-oblong, very entire; on leaf stalks: stem round, branched. *Linn. Syst. Nat.* 815.—*Mantiff.* 136.

P L A T E S.

Gmel. 24. 2.—*Fl. Dan.* 349.—*Gif.* 1. 24.—*Morif.* xv. 8. row. 1—6.

ROOT, flat at bottom, swelling from the stem.

STEM, very short, woody, branched.

LEAVES, oblong, obtuse-pointed; margin smooth, with a mid-rib, and branching veins.

FRUCTIFICATION, roundish, on footstalks.

OBSER-

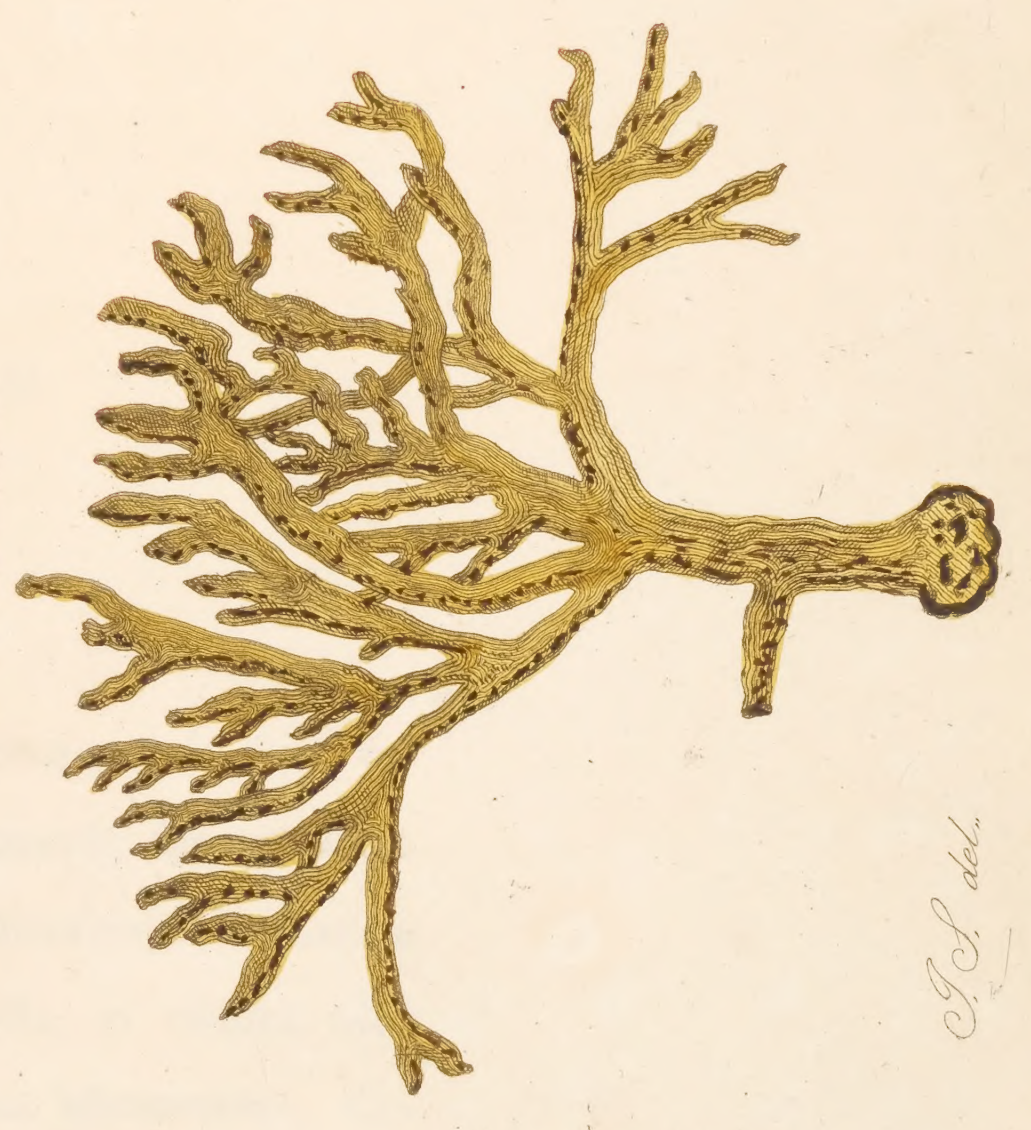
Q. Rubens



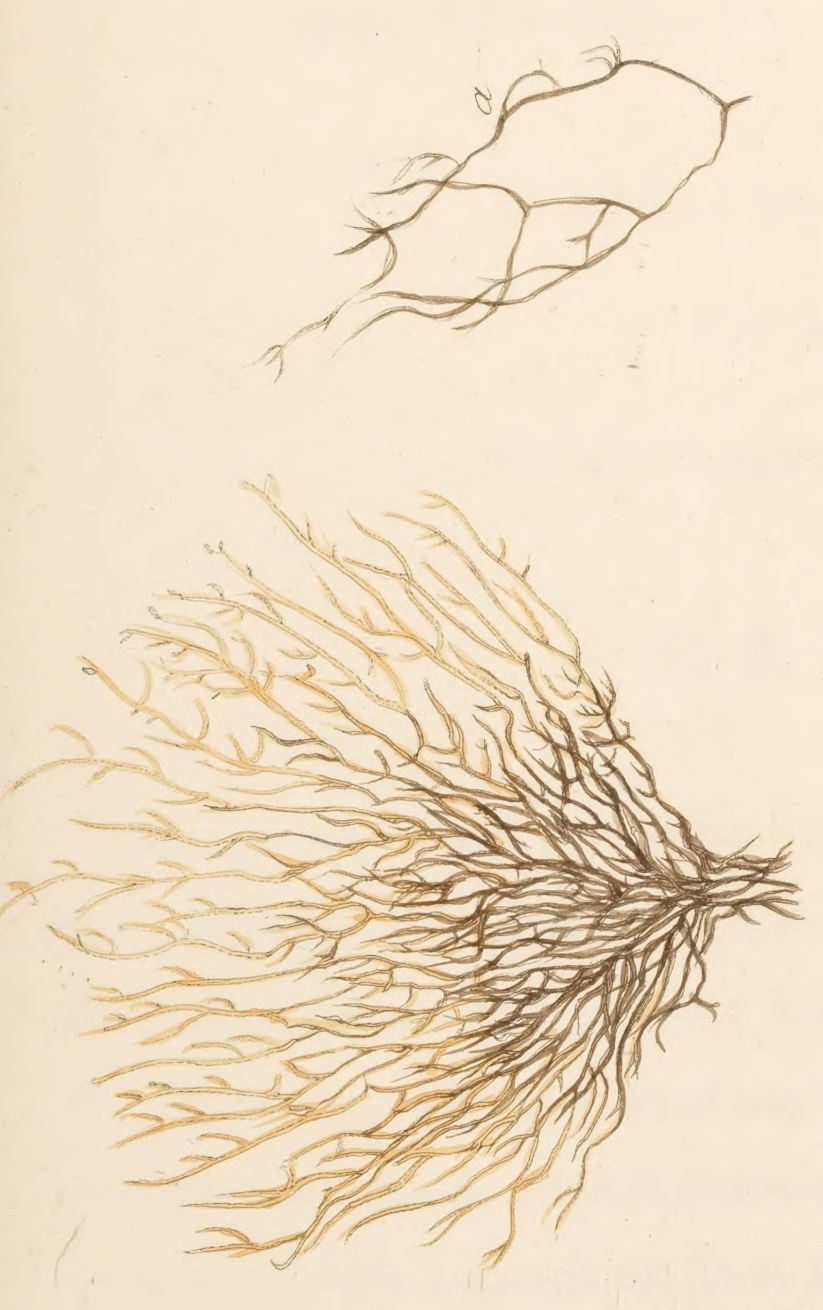
Q. sanguinea



Q. Tomentosa



J.S. del.



O B S E R V A T I O N S.

THIS elegant Fucus was not noticed by LINNÆUS in his early publications, and from the account of Ray it appears to be confined to the ^a Western shores of this Island. Unless by a rare accident, it is never met with in a perfect state. I have found it at WEYMOUTH, and from thence down the coast to the Land's End. Its favourite situation is in deep bays, and protected from the Westerly winds. MOUNTS-BAY in Cornwall abounds with it. Though Authors mention the leaf as extending to a foot in length, I have rarely found it of six inches; its breadth is about an inch and half; it is rounded at the tip, and has been thought to resemble the *Rumex obtusifolius* or broad-leaved Dock, from whence its name. The root is swelling, and with a flat base adhering to rocks, and the stem or branches very short in proportion; scarcely one sixth of the length of the leaf. The substance of the leaf is as thin as Gold-beater's skin; its colour, pink, or red; often barred across with faint stripes of a dull pinky yellow, like the stripes in the leaf of a tulip. The leaves are in general few in number, though occasionally there are clusters of them. The fructification differs essentially from its kindred plant. Among the numbers I have seen I have not yet discovered it; it is described by Cæder and Hudson, as a roundish, black-red fruit, fixed on the footstalk of the leaves, and sometimes ^b higher up. It is right to notice that there is a succession of minute leaves at the bottom, and that here and there are to be met with small leaves budding forth from the mid-rib of the leaf, as in *F. rubens*.

Hab. Western shores of this Island, Ireland, Guernsey; sometimes on the Eastern Coast, as at Yarmouth.

Mr. WOODWARD.

^a This must not be understood exclusively, as Mr. Woodward has gathered it very perfect at Yarmouth.

^b See the Latin note.

F U C U S T O M E N T O S U S.

TAB. VII.

FUCUS. fronde subtereti, crassa, ramosa, subdichotoma, furcata, tomentosa, angulis ramulorum, rotundiusculis. *Hudf. Fl.* 584.—*Hist. Ox.* 3. 647.—*R. Syn.* 29. 3, 4.

RADIX, è basi caulis intumescens, subtus plana, faxis agglutinata.

CAULIS, sub-teres, crassus, brevis, tubulosus.

RAMULI, sub-teretes, tomentosi, angulis ovalibus, vel rotundiusculis.

O B S E R V A T I O N E S.

SPECIES hæc nullibi, ut opinor, nisi apud DANMONIOS occurrit. Ramuli pennæ anserinæ magnitudine, ordine plerùmque dichotomo proveniunt. Planta recens, in arenâ projecta, vel sub aquis immersa, spongiæ ad instar humore repleta est; propiore autem inspectu fibrillis lanosis, ut ope microscopii observavimus, intertexta est. Ramuli tubulosi muco tenui implentur; transversim autem, vel per longitudinem secti, vi elasticâ adeò contrahit sese cuticula, ut fructificationem intus, ut videtur, latentem indagare, frustra adhuc laboraverim. Color amœnè viridis exsiccatione, ut in Fucis quamplurimis, statim nigrescit. Observandum est, characterem *F.*

tomentosi apud Hudsonum “fronde compressa, dichotoma, obtusa” quodammodo cum plantâ nostrâ convenire; minimè autem *F. elongati* apud eundem, qui, ut rectè admonet, D. Woodward. *F. loreo* perquam affinis est. Rectiùs, ut videtur, Morisonus noster, “*F. spongiosus, teres, ramosus, viridis, erectus,*” quem tamen, nunquam à se visum, ut suspicor, *F. elongato* incautè ascribit LINNÆUS. Nec dubium est quin “*Spongia dichotomos*” Raii, Syn. 29, 3, 4. huc referri debeat: plantula sc. quæ, ut sub aquis, aut exsiccata, oculis subjecta fuerit, vel spongiosi, vel tomentosi, characterem apud Botanicos obtinuit.

Hab. in littoribus Devonix et Cornubiæ: copiosè in rupe Long Rock dictâ, prope oppidum PENSANCE.

Hon. Mr. WENMAN.

^a Morif. Hist. Ox. 3. 647.

DOWNY FUCUS.

PL. VII.

FUCUS. frond roundish, branched, velvety, obtusely forked at the tips: the angles of the forks and branches roundish.

P L A T E S.

Morif. Hist. Ox. 15. t. 8. f. 7.

ROOT swelling out from the bottom of the stem, flat underneath, agglutinated.

STEM short, roundish, hollow within.

BRANCHES, roundish, tubular, downy, forked, sub-dichotomous.

OBSERVATIONS.

THIS species, which most probably occurs nowhere in England, but on the coasts of Devon and Cornwall, has occasioned much confusion to modern Botanists. Its general height is about six inches; the branches of nearly an equal size throughout, which is that of a small quill. It arises from a single stem; is generally dichotomous, and bushy in its habit; forked at the tips, with the points obtuse. When taken fresh from the sea, or viewed in a basin of water, it has the appearance of a sponge; when a little drained, it has a most beautiful and soft, velvety appearance; and when quite dry, and in a state of preservation in the cabinet, it appears to the eye, and still more with the assistance of a glass, to be wholly composed of black woolly fibres. Hence it has been called alternately woolly, downy, or spongy; nor has its nature been known to those, who have not visited it on the spot. It is accurately described as a sponge by our countryman Ray, Syn. p. 29. 3, and probably 4. as likewise by Morison, Hist. Ox. 3. p. 647. whose figure is a pretty faithful representation of it. The colour of the recent plant is a beautiful grass green, sometimes inclining to olive.

Hab. On the Devonshire and Cornwall Coasts: on the Long Rock between MARAZION and PENSANCE plentiful. Hon. Mr. WENMAN.

FUCUS

F U C U S P L I C A T U S .

TAB. VII.

FUCUS. fronde cartilaginea, filiformi, ramofissima, implicata, diaphana. *Hudf.* 470. 589.

..... fronde capillari ramulis, subsecundis implicatis diaphanis. *Lightfoot.* 929.

Gmel. 142.

RADIX, subtus plana?

CAULIS, capillaris, intortus; (plurimi simul nascentes, implicati).

RAMULI filiformes, implicati, sub-secundi, ramulis nullo ordine brevissimis.

FRUCTIFICATIO, exigua, globosa, lateralis.

O B S E R V A T I O N E S .

FUCUS hic, à LINNÆO prætermiffus, Plukenetii tabulæ 184, refertur, etfi haudquaquam ut observavi “coloris aurei.” Varietates duas constituit D. Hudson. ed. 1^{ma} 470, plantas sc. Doodii. App. 329, 330, quæ tamen à Raio, Syn. n. 26 and 27. p. 51, ut species diversæ reputantur. Rarò admodum in arenâ recens projicitur, adeò ut minimè mirum fit, si inter se discrepent Botanici. D. Lightfoot. plantam recentem, et exficcatam observavit, et utramque accuratiffimè descripsit. E radice, quam nunquam adhuc observavimus, plures exire videntur cauliculi filiformes, implicati; ramulis nullo ordine dispositis, uniformibus, sub-secundis; è quibus ramuli alii brevissimi; five pullulantes solùm, seu fructificantes, sparsim nascuntur. ^a Ramuli hi, vitro aucti, summitatibus purpureis diaphanis conspiciuntur. Magnitudo ramulorum filum emporeticum æquat; color, ad lucem purpureus, aliàs subfuscus, apicibus frequenter pallidè luteis, et quasi exficcatis. Soli expositus citò indurefcit, et icthyocollam ementitur. Fructificationem nunquam observavi; à D. LIGHTFOOT. globosa exigua, lateralis describitur, ideoque F. verrucoso affinis videtur species. In specimine penes D. Woodward. fructificatio terminalis reperitur.

Hab. In australi et occidentali Angliæ littore frequens reperitur.

^a Vid. a. in icone ubi ramuli aucti delineantur.

M A T T E D

F U C U S .

PL. VII.

FUCUS. frond griftly, of an equal fize, much branched, matted, semi-transparent. *Hudf.*

470. 589.

..... frond capillary little branches, mostly one way. *Lightfoot.* 929.

P L A T E S .

Gmel. F. 14. 2.—Fl. Dan. 408.

ROOT

ROOT supposed to be flat at bottom.

STEM thread-shaped, crooked, horny ; many together from the base, entangled.

BRANCHES, thread-shaped, entangled, growing without order, with short budding shoots.

FRUCTIFICATION, small lateral globules.

O B S E R V A T I O N S.

THIS plant, like *F. ceranoides* of Hudson, seems to be very rapidly blanched, when cast on the sands. Its cartilaginous, horny substance is undoubtedly the cause of it. On this account it is very rarely met with in a growing state, which has occasioned no small confusion among modern Botanists. Ray's n. 26, 53 and 57, in the Synopsis, p. 45, 51, have been successively, and, perhaps, all of them erroneously referred to by different Authors. LINNÆUS makes no mention of it. It is well denominated from its mode of growth, being so entangled, and so horny and brittle as not to be unravelled. It may arise either from a flat base with numerous matted stems, or else, like *F. fastigiatus*, it may have a fibrous origin. I have never seen it perfect at bottom, and suspect from the substance being so brittle, that the root is seldom torn off with the plant. Numerous branches are produced in all directions, which grow in a kind of net-work ; the principal of which are furnished with very short, budding, or fruiting branches ; the height of this plant rarely exceeds 6 inches ; the size of stem and branches is not bigger than small packthread ; the purple colour does not appear, but when held to the light, or in the summits of the buds ; in other situations it is of a dark brown, and not unfrequently the summits are light coloured and transparent. Gmelin mentions it, as an orange-red, which must be a foreign variety, or, perhaps, a different plant. The fruit, as described by Lightfoot, shews its affinity to *F. verrucosus*. When found blanched, which is the usual appearance, it resembles the strings of a *Kit*, or small fiddle, matted together.

a. A single plant detached.

b. A branch with the budding shoots magnified.

Hab. at WEYMOUTH, and on all the W. Coast, plentiful.

F U C U S ACULEATUS.

TAB. VIII.

FUCUS. fronde filiformi, compressa, ramosissima ; dentibus marginalibus, subulatis, alternis, erectis. *Linn. Syst. Nat.* 814.

..... ramis sparsis, spinis mollibus alternis. *Linn. Sp. Pl.* 1161.—*Gmel.* 130.—*Hud.* 485.
R. Syn. 48.—*Lightfoot.* 924.—*With.* 3. 259.

RADIX orbiculata, subtus plana.

CAULIS, lævis, solidus, rotundus.

RAMULI sub-compressi, prælongi ; ramulis aliis sparsis ; spinis mollibus.

FRUCTIFICATIO, axillaris, obtusè echinatus, per maturitatem expansus.

OBSER-

O B S E R V A T I O N E S.

SPECIES hæc in quibusdam cornea admodum et tenax, in quibusdam substantiæ penè gramineæ, è profundo mari in littus projicitur. Caulis pennæ anserinæ magnitudine, brevis, inflexus, solidus, lævis. Ramuli prælongi, compressi; spinis per totam longitudinem alternis, erectis, acutis, mollibus. Ramuli hi primarii undique aliis obfidentur, nullo ordine dispositis, triuncialibus, (aut suprâ) spinosis, compressis. Observandum est habitum magnoperè variare: in quibusdam individuïs, ramuli sparsim producuntur; in aliis ita densè congesti sunt, ut caudam equinam, ut rectè observavit D. Gunner, quodammodo referre videatur Fucus hic. Haud equidem certè scio, an species sint diversæ, vel solummodò varietates; minùs accurata tamen F. caudati descriptio apud D. Lightfoot. p. 926. Caulis enim, ut suprâ notavi, rotundus, crassus; ramuli autem semper sunt compressi, et cùm color luteo-viridis, et fuscus in eâdem plantâ haud rarò reperiatur minimè mirum est si unus et idem sit F. aculeatus et F. caudatus. Fructificationem huc usque latentem nuperrimè detexi. In axillis ramulorum producitur fructus, obtusè echinatus, irregularis, per maturitatem sese expandens, substantiâ intus granulatâ. Nonnisi hyeme fructiferum esse suspicari libet, mense enim Februario collegi. Si dentur species duo, Fuco caudato referenda est hæc descriptio. Etsi character essentialis LINN. satis aptè conveniat, notandum est obitèr, nomen triviale “muscoidis,” et observationem ut “exsiccatu nequeat a Muscis distingui,” Sp. Pl. 1630. minimè convenire cum plantâ nostrâ. Fucus etiam fœniculaceus Raii Hist. 3. 13. in segmenta adeò tenuia capellacea, brevia, &c. divisus, toto cœlo, ut videtur, à Fuco aculeato differt.

Hab. juxta Promontorium PORTLAND HEAD dictum, nec non in occidentali Angliæ littore copiosè.

PRICKLY F U C U S.

PL. VIII.

FUCUS. frond thread-shaped, compressed, much branched: marginal teeth awl-shaped, alternate, upright. *Linn. Syst. Nat.* 815.

..... branches without order, prickles soft, alternate. *Linn. Sp. Pl.* 1161.

P L A T E S.

Fl. dan. 355.—*Hist. Ox.* xv. 9. row. 1. 4.—*Gmel. Lib.* 12.

ROOT swelling, flat at bottom.

STEM round, smooth, solid, horny.

BRANCHES, compressed, extended; with alternate, sharp, soft prickles.

FRUCTIFICATION at the setting in of the branches, near the bottom, irregular, obtusely echinated, expanded.

O B S E R V A T I O N S.

THIS Fucus inhabits deep waters, and is often caught in the Fisherman's Trawl, as well as thrown on the shore. Its ramification is singular, and has caused it to be compared to the tail of a forrel horse. The principal branches are much extended, and come out from one, to three or more, from a crooked, twisted, wiry stem of the size of a small quill. This stem is of a shining smoothness, either of an olive, or brownish red colour, and being cut through appears to be solid. The primary branches, which are often two feet long, are garnished

through their whole length with branches coming out without order, usually single, but sometimes two, or more together, all nearly of a length, which is about four inches, and these branches have occasionally other smaller ones. Both primary and secondary branches vary little in size from each other, and are beset on each side, with crooked, sharp alternate prickles pointing upwards. This plant, which is by no means uncommon with us, has occasioned strange perplexity among Authors. Though well described, as to the soft spines, it does not appear to have been known to LINN. otherwise he would not have referred the Fennel-leaved F. of R. Syn. 3. 13. to it, or have made the observation, that "when dry it resembled a Moss." Sp. Pl. 1630. It is strange this should have escaped the penetration of Lightfoot, who certainly was well acquainted with the plant in all its forms. This latter author has given a var. (β), which probably is only an older, and more luxuriant plant. It is strange that the thick fleshy stalk is not noticed. Lightfoot says expressly the stalk is very small: Major Velley says thread-shaped. With. Bot. Arr. 3. 260. I have many that answer this description, but I incline to think the elder plants, having their heads either torn off by the sea, or eaten off by fish, swell into those woody, crooked, cylindrical stems from whence the principal branches are thrown up. I was fortunate enough to procure this plant in seed this Winter, and, as I have before observed, I suspect the fruiting time of many Fuci to be during the Winter months. It consists of an irregular, echinated, wart-like excrescence coming out near the bottom at the setting on of the branches. It expands, when ripe, and falls down round the branch, exposing to view a beautifully granulated surface, yellowish, studded with brown.

a. a. The Fruit, natural size.

b. The same, magnified.

Hab. at the Bill of PORTLAND ISLAND, and on all the S. Coast of Devon and Cornwall.

^a Though the Linnæan specific character is adopted both in Lat. and Eng. it must be remarked that it was most probably intended for a different plant, though strikingly characteristic of this.

FUCUS VERRUCOSUS. TAB. VIII.

FUCUS. fronde filiformi, tereti, ramosa; ramis alternis subdistychis, longissimis uniformibus; (*fructu verrucoso, sparso, laterali*). *Lightfoot.* 928.—*Huds.* 1. ed. 470, 588.—*With.* 3. 256.—*Ray. Syn.* 51.

RADIX orbicularis, subtus plana.

CAULIS filiformis, teres, ramosus.

RAMULI, longissimi, filiformes, nullo ordine, quandoque plures ex uno latere.

FRUCTUS, sub-globosus, lateralis.

OBSERVATIONES.

SAXIS, lapillis, conchisve agglutinata longissimè extenditur species hæc; ramulis ejusdem ferè magnitudinis à radice ad summitatem filiformibus, sc. diaphanis, teneris. Juxta basim juniores nascuntur furculi, ramis avulsis suppositandis, ut in F. fastigiato, observavimus, designati. Tempore fructificandi verrucæ sub-globosæ, laterales, pro magnitudine plantæ satis amplæ (non, ut ait Gmel. *parvulæ*) producuntur. Vesiculæ minus rectè nominantur à D. Hudf. ed. 1. p. 470; solidæ enim sunt, aut saltè muco spisso admodum repletæ. Fucus hic à D. Lightfoot. p. 928. *flagelliformis* vocatur, satis aptè quidem, si longitudinem spectes in quibusdam individuis,

dividuis, apud nos communiter pedalis, vel etiam semi-pedalis reperitur. Maris æstu irretitus, et in nodum collectus in arenâ projicitur, ita ut *F. plicatus* quodammodo referat; facile autem distinguitur substantiâ tenerâ admodum, et gelatinosâ, necnon magnitudine fructûs. Color rosaceus, in quibusdam olivaceus, ferè semper ad radices ruber, ut in icone. *Fucus plicatus*, è contra, ligneus admodum, ramulis, non maris æstu, sed modo crescendi, implicatis.

Hab. in littoribus Devonix et Cornubiæ.

WARTY FUCUS.

PL. VIII.

FUCUS. frond bristle-shaped, cylindrical, branched; branches alternate, very long, of one size throughout: fructification warty, scattered, lateral.

P L A T E S.

Fl. Dan. 358. 650.—*Gmel. f.* 13.—*Aët. Gall.* 1712. t. 5. f. 9.

ROOT orbicular, flat at bottom.

STEM bristle-shaped, cylindrical, branched.

BRANCHES, very long, size of the stem, without order, many from one side.

FRUCTIFICATION wart-like, scattered, lateral, large.

O B S E R V A T I O N S.

THIS plant affixes itself to pebbles, shells, &c. and is frequently thrown on the beach in a growing state. Its usual length with us seldom exceeds 6 or 9 inches; though Lightfoot, who calls it *flagelliformis*—**WHIPCORD FUCUS**, has found it 2 feet long. The base is a small knob firmly adhering to its place of growth, which sends out a few long straggling branches of one uniform size throughout—that of packthread. The base, or root throws up a succession of shoots, which are intended to supply branches in the place of those, either torn off, or eaten by the fish. Its substance is tender and transparent: the colour rose, or olive; and, not unfrequently, the former near the root, with the upper part olive. This plant, being tender and flexible, is apt to be much entangled by the waves, so as to occasion a difficulty in separating. During the Summer months, the fructification is commonly to be met with, and is very conspicuous (not *minute*, as Gmelin and Lightfoot have described it), but large in proportion to the plant, ^a globular, sessile, filled with *mucus* within, and coming out without any order on the sides of the branches. This species, even in its entangled state, may be easily distinguished from ^b *F. plicatus*—matted *F.* which is very horny, stiff and cartilaginous, and appears to be matted and entangled, not by the waves, but by its peculiar mode of growth.

Hab. on the Coasts of Devonshire and Cornwall.

^a Semi-globose, according to Mr. Woodward, and probably the English term *Warty* best expresses the idea which is flat at the base, or point of contact with the skin.

^b See *F. plicatus*. Pl. VII.

FUCUS ARTICULATUS.

TAB. VIII.

FUCUS. fronde articulata, ramofissima; articulis ovato-cylindricis; ramis oppositis, et verticillatis. *Lightfoot.*

ULVA. tubulosa, ramofissima articulata: articulis cylindricis; ramis oppositis. *Hudf.* 476.
569.—*Lightfoot.* 959.—*With. Bot. arr.* 3. 240.

RADIX è basi caulis intumescens, subtus plana.

CAULIS, brevis, ovato-articulatus.

RAMULI ovato-articulati, oppositi, ad nodos aliquando verticillati.

FRUCTIFICATIO in punctulis, rotundis, juxta summitem immerfis.

OBSERVATIONES.

PLANTA hæc apud Hudsonum inter Ulvas enumeratur, et si fructificationem in substantiâ articulorum *immersam* perpendamus, inter Ulvas adhuc forsân recensenda est. In tantâ fructificationis obscuritate, si dentur genera intermedia inter Fucum, et Ulvam, species hæc, una cum F. verticillato, F. repenti, et aliis fructu punctato, *immerfo*, locum suum seorsim obtinebit. Utcunque se res habet, duplicem Fuci fructificationem, “villosam, et granulatam,” in hac specie incassum perscrutabimur. Affinis videtur F. verticillato, et F. repenti. E basi planâ caulis affurgit brevis, ramulis undique oppositis, foliolis, seu potius articulis, binis sæpissimè, aliquando quaternis ad nodos articulorum. Articuli singuli, ut rectè observat D. Lightfoot. ovato-cylindrici, apicibus acuminatis; gelatinosi, tubulosi. Altitudo plantæ rarò triuncialis; color, vel rosaceus, vel dilutè purpureus; haud rarò etiam luteo-viridis; splendens, pellucidus. Varietas occurrit articulis compressis, et, ut videtur, solidis, rariùs ad nodos verticillata cujus occurrit descriptio sub nomine Corallinæ in Synopsi Raii 34. Observandum est F. repentem D. Lightfoot. 964 etsi articulatione affinis sit, minimè pro varietate hujus speciei recensendum esse. In Walliâ ad oppidum *Tenby* frequentèr collegimus, cartilagineum et tenacem, rupibus præruptis, maris æstui oppositis firmitèr adhærentem, ope fibrillarum vel radiculorum. Fuco articulo nulla ferè est species vulgatio in Cornubiâ, nec est piscibus, vel insectis marinis alendis, accommodatio. Species hæc ferè semper parasitica est, et nunquam, ut suspicor, è nudo saxo oritur.

Hab. In Devonix et Cornubiæ littoribus.

ARTICULATED FUCUS.

PL. VIII.

FUCUS. frond jointed, very much branched; joints egg-cylindrical, tubular; branches opposite, with “occasional” whorls of 2 and 4. *Lightfoot.* 959.

ULVA. tubular, jointed, branches opposite, forked. *Hudf.* 569.

P L A T E S.

Hist. Ox. xv. 8. row. 2. 14.



F. Aculeatus



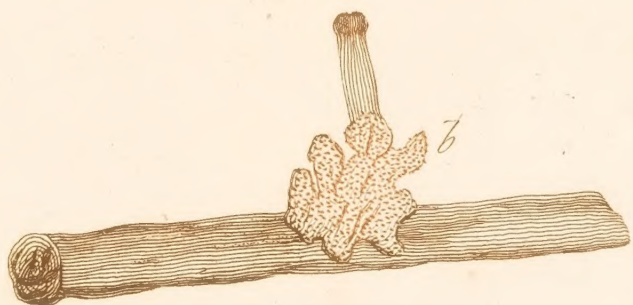
F. Verrucosus



F. Articulatus



F. Articulatus



ROOT swelling out from the stalk, flat beneath.

STEM short, slenderer than the branches, jointed; joints egg-cylindrical.

BRANCHES opposite, jointed, swelling in the middle, whorls of leaflets in 2 and 4.

FRUCTIFICATION, blood-red dots imbedded.

O B S E R V A T I O N S.

It is remarkable that this species, so common with us, is omitted by LINNÆUS. Its particular mode of growth, the branches resembling strings of oval beads, sharp at each end, give it the appearance of some of the geniculated *Conservæ*, and still more of some of the Corallines. Lightfoot and Dr. Withering class it among the *Fuci*, and, though it may be more nearly related to that Genus than to *Ulva*, yet from what I have remarked on the essential character of *Fucus*, it will, I trust, be absolutely necessary to sub-divide that Genus. There appear to be several varieties differing in size and colour, as well as in the flatness or roundness of the joints: the usual size from 2 to 3 inches high, pretty thickly branched; the branches, at first, opposite, towards the summits, dichotomous. The joints of the stem, and the branches, small at bottom, bigger in the middle, and small at the top. At the joinings often come out leaflets, like the joints, but slenderer, in whorls of 4, or in pairs. It seems as if this appearance, which nearly connects it with *F. verticillatus*, does not take place universally, and only in the cylindrical species, as Hudson and Ray mention nothing of it. The round jointed species is tubular, many of the compressed kinds appear to be solid; which, however allied in general habit, tenderness, and transparency, will keep them asunder. These plants are oftener Parasites, than Rock plants: the stems of *F. digitatus* are covered with them. The colours, pink, pale purple, or yellowish green, beautifully transparent. The fructification, minute blood-red dots, imbedded in the upper joints.

Hab. common.

N. B. Since printing the Preface to this *Fasciculus*, wherein I described the mode of preserving and displaying the specimens, I have had a correspondence with an ingenious * Friend, who is a very accurate Botanist, and he informs me *from his own experience*, that the larger and more succulent specimens are apt to grow mouldy, even after they have been treated with all the attention I have recommended. This arises from the quantity of salts remaining after pressure. To remedy this, he has steeped his plants in large earthen pans filled with fresh water for several days, changing the water twice or thrice a day; and by this method he has preserved some fine specimens of the largest kinds, which have kept their freshness and beauty for several years, without the slightest appearance of any mouldy stains.

* The Rev. Mr. BAKER, of Stouts Hill, Gloucestershire.

The section in Major VELLEYS Plate of *F. vesiculofus*, which I had considered as a bisected Air bladder, I find upon reference to the Plate and the Explanation, to be a transverse section of the distended summit in a magnified state. This has been kindly communicated to me by the Major himself. It

It may be necessary to repeat here, that the Theory of the *concealed fibrous fructification*, as far as regards *F. vesiculofus*, rests entirely on the silky filaments being found *constantly on the inside of the bladder*: as this plant is furnished with imbedded, urn-shaped vessels in the same manner as *F. ferratus*, it may involve a difficulty, as supposing a two-fold male fructification; but the same does not hold with *F. filiquosus*, where the filaments are found extended longitudinally across the cavities of the pod. In treating too of *F. speralis*, it is insinuated that *F. divaricatus* is not furnished with air-vessels. The Plant I have taken for this species, has few, if any, and those inconsiderable ones; but Lightfoot asserts it is vesiculated, and Major Velley's Observations confirm the fact. But notwithstanding the difficulties which may attend the investigation I cannot help being of opinion, from the silky filaments constantly found on the inside coat of the air-bladder, that some further use than mere buoyancy is intended by Nature. May it not be to mature the impregnating vapour, and to preserve it from contact with water? However the case may be, it is hoped the attention of those whose situation gives them an opportunity will be directed towards this subject.

F. SANGUINEUS. Pl. VII.—Since the foregoing sheets have gone to the Press, the President of the Linn. Society has favoured me with a sight of a Plant of this species, most beautifully fructified. By his permission, the segments of the leaf stalk (*a.* natural size: *b.* magnified) have been delineated and inserted in the Plate. These fructifications will appear at first sight to be very nearly similar to those on the stalks of *F. rubens*, and, if they are really pedunculated, the upper part of the pedicle is considerably inflated. It appears rather *pyriformis*—pear-shaped, which, with some undulations, is the form of the mucous fruit with the blood-red granules on the stem and the edges of the leaf in *F. rubens*, as will appear by the inspection of the magnified Drawings of that Plant.

FUCUS SACCHARINUS. TAB. IX.

FUCUS. fronde cartilagineâ, simplici, rugosâ, ensiformi. *Linn. Sp. Pl.* 1650.—*Bauh. Pr.* 154.—*Pin.* 364.—*Raii, Syn.* 39.—*Lightfoot,* 940.—*With. Bot. Arr.* 4. 96.

Var. β.—*Linn. Tr.* 3. 151.

RADIX divaricata, lignea, agglutinata.

CAULIS teres, brevis, solidus.

FRONS simplex, ensiformis, prælonga, in medio * bullata.

FRUCTIFICATIO mucosa, reticulata: interna, vel in finibus rugarum.

SEMINA minutissima.

OBSERVATIONES.

FUCUS hic, *Balteiformis* RAIJ, *Phasganoides* BAUHINI, è caule rotundo, breviusculo in longitudinem cubitalem, aut suprâ, producitur. Frons^b simplex, crassa, in medio eximiè rugosa, marginibus undulatis, apice rotundato. Radix fibrosa, et^c glutine tenaci instructa tantam plantæ molem commodissimè sustentat. Superficies glaberrima, nitens, et quasi vernice quodam obducta; color olivaceus, maceratione plantæ in aquam efunditur. Edulis hæc planta est; cocta tamen, et lacte infusa: exsiccata, autem et ad parietem suspensa, ad dignoscendas cœli mutationes pauperum fit *Hygrometer*. E plantâ ficcâ sal, sacchari gustu exsudat, autore SIBBALDO, unde nomen a LINNEO sumptum. Frons quandoque ad basim triquetra est.

Fructificatio juxta D. GMELIN in finibus rugarum sita est: attentissimè rem perpendenti, nec non microscopii compositi ope multoties repetitâ, mucum internum reticulatum per totam frondem maturo tempore fructiferum esse, feminulaque in sinus per foramina lente maximè augenti conspicienda^d unâ cum mucō evadere constat. * Vesciculæ irregulares, innatæ in fronde, sicut in F. digitato, reperiuntur; et in iis, tempore opportuno, granula quædam interiori cutis superficiei adhærentia observavi: hinc libet conjicere plantas hæc congenere esse.

(V A R. β.)

FUCUS. fronde simplici, planâ, ensiformi. *Herb. Buddle. p.* 21.—*Petiver. v. 1. p.* 15.—*Linn. Tr. v. 3. p.* 151. var. α.

AFFINIS valde præcedentis, si non sit potius F. digitati varietas; qui persæpe stipiti brevi innititur; fronde quam maximè dilatatâ et indivisâ.

L

SUGAR

* Frondis superficies aliquando, sed perrarò occurrit sine bullis.—Var. α. D. D. Goodenough et Woodward. Gmelin, t. 28.

^b Et si duo, tres vel plures quandoque plantæ radicibus inter se implicatis reperiuntur, singulæ tamen ex singulis radicibus oriuntur.

^c Corrigendus hic error in priore Fasc. ubi radices F. digitati ramificatione solâ plantam sustinere afferui.

^d Seminula in superficie F. digitati detexi. Vid. Præf. Lat. p. xxi.

* Vesciculæ hæc a bullis, ut vocantur, distinctæ sunt; et forsan, rugæ in medio frondis, ex unâ parte convexæ, ex alterâ concavæ minus rectè vocantur bullæ, quæ aërem inclusum denotant.

SUGAR FUCUS.

PL. IX.

OR

SEA BELT.

FUCUS. frond simple and undivided, welted, sword-shaped.

P L A T E S.

^a *Gmel.*—t. 27.—*Act. Gall.* 1712. t. 3. f. 4.—*Gunn.* ii. 7. 2.—*Oed. Dan.* t. 416.

ROOT spreading, fibrous, woody.

STEM short, cylindrical, solid.

FROND sword-shaped, very long and broad; thick, stiff, and welted in the middle; margin thinner, undulated.

FRUCTIFICATION internal, or in the folds of the wrinkles; consisting of a reticulated, tubular, transparent mucus.

SEEDS very minute; only at times discoverable by the microscope.

OBSERVATIONS.

THIS is one of the largest growing *Fuci*, often extending more than a yard in length, and four or five inches in width. It consists of a ^b simple undivided frond, shaped and welted as above described.

This frond is of the most polished surface, and shines as if it had been varnished over; its substance is cartilaginous, and remarkably full of deep longitudinal sinuses near the margin, and irregular cavities and protuberances transversely: the ^c *bullæ*, as they have been called, being hollow or indented on one side, and in relief, or prominent on the opposite one.

Nature has furnished this plant with a strong, woody, fibrous root, by which it insinuates itself among rocks or ooze, or lays hold of large pebbles and the stems of other *Fuci*, and these roots are supplied with the same *Gluten* that abounds in the discoid bases of the rest of the genus. Its name of *Saccharinus*, or Sugar Fucus, was adopted by LINNEUS from SIBBALD's observation of its exuding a white sugary efflorescence when dry: RAY's term *Belt-shaped*, and BAUHINE's *Sword* or *Scymitar-shaped* are certainly more appropriate.

This species is eaten in the Northern part of the Island; not raw, but boiled with milk; and, when dry, and suspended in an airy place it forms an admirable Hygrometer, and preserves its qualities for years.

With

^a Gmelin's Plate is not very expressive of its figure: it represents three stems growing from one root.

^b Small clusters of these plants are sometimes, though rarely, met with, but each has its separate root.

^c The term *bullæ* has been applied by respectable authority to the transverse welts in the middle of the frond, but as the Latin term implies a hollow Ball, it does not hold good, as will be seen by a transverse section of the frond.

With respect to its mode of Fructification, I have paid great attention to it under the different powers of my microscope in all stages of its growth, and at different seasons of the year. ^a Gmelin says the *sinuses* on the frond are filled with a prolific *mucus* containing naked seeds. Having nicely pared off the external coat, I found the internal substance the same as in the kindred plants of *F. digitatus* and *polychides*—a *reticulated pellucid mucus with a membrane of partition in the middle*. This membrane consists of tubular vessels, as I have described in ^b *F. digitatus*. At some seasons of the year irregular ^c bladders similar to those on *F. digitatus* are observable, which may be considered I think as an expansion of the mucus preparatory to fructification. On dissecting these bladders I could perceive the reticulation in the *mucus*, which is now more fluid; and, at some favourable moments I have seen clusters of very minute seeds, as I suspect them to be, adhering to the inner coat of the bladder. The surface under the strongest magnifiers, when the fructification is matured, discovers minute apertures like ^d pin-holes; from whence we may imagine that the mucus or seeds, which Gmelin observed in the *sinuses*, were discharged from within. On maceration this *Fucus* gives out a brown tint.

(V A R. β .)

FUCUS. frond smooth, without welts.

P L A T E S.

Gmel. 28.—*Act. Nat. Cur.* v. 8. t. 9. f. 2.

THIS variety is inserted on the authority of BUDDLE and PETIVER's *Herbaria*. I have never yet met with it. I should imagine that the dried specimens in the *Herbaria* of BUDDLE and PETIVER were more ensiform than the figure of Gmelin, in order to entitle it to a place here. I am rather inclined to arrange Gmelin's t. 28, as a variety of *F. digitatus*.

N. B. This species from fructification belongs to Genus *Ceramium* of the Synoptic Table.

^a Lightfoot has quoted Gmelin's words without acknowledging it; I question if he confirmed the truth of it by his own experience.

^b See the Introduction, p. xiii.

^c See PL. III. a, a.

^d These may be the absorbent pores.

F U C U S PHYLLITIS. TAB. IX.

FUCUS. fronde membranaceâ, planâ, simplici, ensiformi; marginibus undulatis; stipite brevissimo. *Raii. Syn.* p. 40.—*With. Bot. Arr.* v. 4. p. 100.—*Lightfoot. F. sacch. var. β .*—*Hudf. var. δ .*

RADIX divaricata, tenax, agglutinata.

CAULIS, brevissimus, teres, corneus.

FRONS, ensiformis, simplex, membranacea, in medio plana, marginibus undulatis.

FRUCTIFICATIO incognita.

OBSER-

OBSERVATIONS.

SPECIES hæc, ut varietas *F. saccharini*, vulgò recensetur, etsi substantiâ et habitu longè dissimilis sit. Multos abhinc annos D. LHWYD in Synopsi RAIJ hujusce plantæ sub nomine *Fuci phyllitidis folio*, mentionem fecit, ac Infulæ MONÆ attribuit.^a Recentiores Botanici parum cautè, ut mihi videtur, cum *F. saccharino* conjungere. D. LIGHTFOOT (Fl. Scot. p. 941.) ait “frequenter a se observari faxis affixas, et mari innatantes juniores *F. saccharini* plantas, mirari tamen se illarum tenuissimam, et quasi membranaceam texturam; manû enim impositum foliolum calore illicò crispari, et intorqueri.” Hinc inductus ut varietas *F. saccharini* potius quam junior planta in Flora Scotica collocavit; hujus secutus exemplum, D. HUDSON.^b duabus prioribus tertiam hanc adjunxit. Re verâ, unus et idem est Fucus hic, etsi in tam diversis littoribus reperiatur, nec ulla ferè species est vulgatiore. Notavimus rugas, bullasve in medio frondis *F. saccharini* sinuosas admodum, et profundas; notavimus quoque craffitiem folii etiam in plantis junioribus: his adjungenda est nota ad distinguendas species etiam per se idonea; *F.* enim *phyllitis* fasciculatim provenit, radicibus inter se implicitis; *F. saccharinus* è contra ferè semper solitarius oritur. Altitudo plantæ rarò pedalis, latitudo uncialis.

Fructificatio incerta admodum. Semel, vel bis inter ramenta a procellis in littore ejecta portionem frondis vesiculis ut in *F. saccharino* obductam repperi. Mucus intus tenuis; haud scio an sit reticulatus necne.

Edulem esse testatur D. LHWYD, nec mirum si *ulvam umbilicam*, cui substantia et tenuitate affinis est, etiam sapore æmuletur.

Hab. in Inf. Mona, Scotia, et in Australi Ang. littore.

^a Vid. RAIJ Syn. p. 40.

^b Vid. quæ observavi respectu var. *bullati* et *simplicis*, in articulo *F. sacchar.*

HART'S-TONGUE FUCUS. PL. IX.

FUCUS. simple, membranaceous, sword-shaped, without a midrib; edges waved and plaited, stalk cylindrical, short.

P L A T E.

^a *Gmel. t. 28. 2.*

ROOT, fibrous, woody, spreading.

STEM, short, round.

FROND, long and narrow, tapering upwards; thin and smooth in the middle; plaited, and flounced at the edges.

FRUCTIFICATION^b uncertain.

OBSER-

^a This, though a very faulty representation, is referred by Gmelin to Ray's Synopsis, p. 40. n. *.

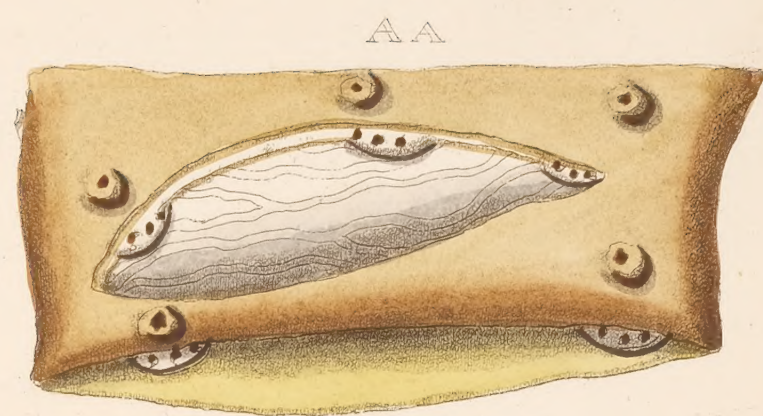
^b Irregular inflated bladders appear at times on the frond, as expressed in the Plate, and these contain a thin mucus, but I have not been able to discover either the network of tubes, or the seeds.



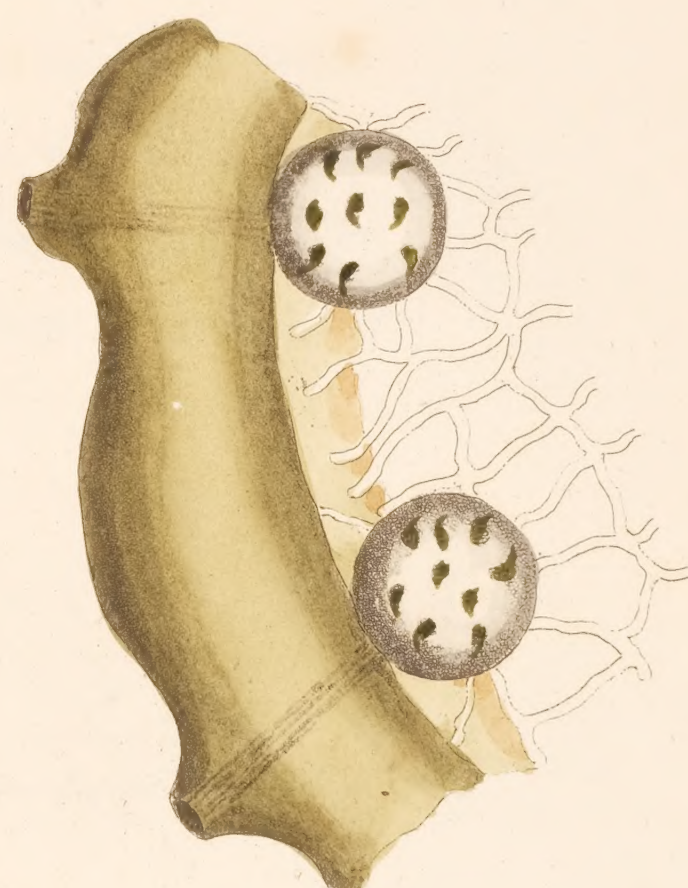
F. saccharinus



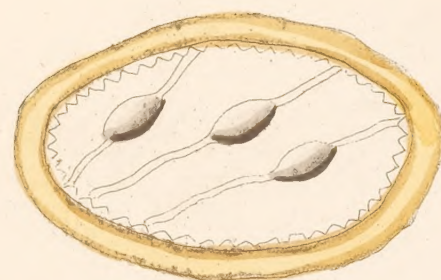
F. phyllitis



C C



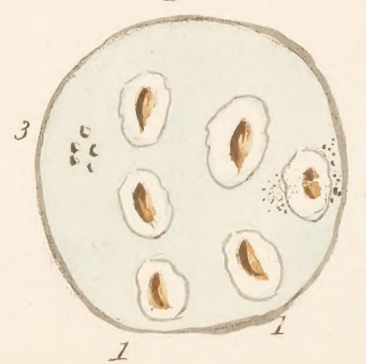
D



E



F



OBSERVATIONS.

THIS, as a rare Welch Plant, has been enumerated in every British Flora since the days of RAY. Its long, narrow, sword-shaped leaf, short stalk, and branching root, has caused it to be taken for a variety of the *Sea Belt* described in the former article. The slightest attention to the habit of that plant would have evinced the necessity of making this a new species. I have found the former very small, and to appearance budding out; but even in that young state, its firm fleshy texture, and strong sinuous wrinkles are very conspicuous.

I entertain little doubt that those small pellucid plants noticed by LIGHTFOOT on the Scottish Coast, so thin as to curl instantly on being laid in the palm of the hand, were individuals of this species, and not varieties of the *Sea Belt*. Hudson likewise in his second edition seems to have noticed this plant, and to have placed it among his varieties. I first discovered it at Tenby in South WALES, and afterwards plentifully at PORTLAND HEAD. In colour and thinness it much resembles the true *Laver*, and I have no doubt might be substituted for it; for we find from Mr. LHWYD that it is eaten in Wales. This *Fucus*, where it is met with, is found in great abundance in pools of shallow water, and has a striking peculiarity, which likewise serves to distinguish it from the great *Sea Belt*, viz. its growing in ^a clusters with the roots entangled together; whereas the *Sea Belt* is usually a solitary plant. The general height is from six inches to a foot, and about an inch wide. I have never seen it of the size mentioned by RAY, Syn. 40, but believe it grows sometimes larger in deep water, as I have found fragments with the bladders mentioned in the description thrown up after storms. The reference to BAUHINE'S Prodrômus, p. 154. n. 4. by LIGHTFOOT must be rejected, as, from the short description given of that plant, it does not seem a native of the British Seas.

^a It is hardly ever found in clusters of less than five or six, and often many more together.

F U C U S NODOSUS. TAB. X.

FUCUS. caule compresso, dichotomo; medio ramorum in vesiculam dilalato. *Herb. Linn. Buddle, p. 13.—Petiver, p. 35.—Sp. P. 1628.—Fl. Lapp. 464.—Bauh. Pin. 365.—Raii, Syn. 48.—Roy. Lugd. 514.—Hudf. 468.—Lightfoot, 918.—With. Bot. Arr. v. 4. p. 84.*

RADIX discoides, faxis agglutinata.

CAULIS, longissimus, ramosus, compressus; vesiculis caule grandioribus.

FOLIA spathulata è margine caulis.

VESICULÆ, caulinae ovatae, ampliatae.

FRUCTIFICATIO, ovata, tuberculata, in apicibus foliorum, è muco retiformi, granulisque orbicularibus, seminiferis constans.

OBSERVATIONES.

UBIQUE occurrit species hæc permixta Fucis vulgatoribus—*vesiculoso, ferrato, et canaliculato*. Vesiculis ovatis

ovatis in caulis medio intumescantibus, necnon habitu crescendi in longum extenso, ab aliis distinguitur. In scopulis alternatim siccis, submersive, æquè ac in profundioribus locis reperitur. Altitudo plantæ variat respectu sitûs; aliquando usque ad ulnas duas accedit. Substantiæ coriaceæ admodum et tenacis est, et in portibus terrâ interclusis, signis haud dubiis etiam *annosa* reperitur.

In istiusmodi plantis vesiculas aëriferas juxta basin plantæ uncias quatuor longas, et cuti erassissimâ obductas cernere est. * Fructus, a vesiculis supradictis longè diversus, in apicibus foliorum producitur, oleam conditam formâ et colore ementitus, tuberculis extûs, ut in *F. vesiculoso*. Portio ejus transversim vel longitudinalitèr de medio ^b secta gelatinam tubuloso-reticulatam, granaque, seu pericarpia orbicularia, feminibus pyriformibus, immerfis exhibet. Maculæ retium in hac specie sub-hexangulæ sunt. Rami bini, ternive prælongi: folia uncialia, vel biuncialia, spathulata, nullo certo ordine, quandoque alternatim, in aliis speciminibus fasciculatim producuntur, et planta tota ramosissima est. Notandum est apices ramulorum ferè semper furcatos, et divaricatos esse, apicibus furcarum longissimis.

Vesiculæ in caule, fila quædam diaphana in medio ostendebant, quandoque aëris inclusi bullis monilis ad instar baccata. Pars interior vesicularum muco chrystallino obducta est. Defunt fila ista, utpote et mucus, in provectionibus vesiculis unde cuivis facilè patebit illorum usus; ætate enim incrassatis vesiculæ lateribus, non opus est intus aëre elastico, quo distendantur. Re verâ, tanta inest vesiculis sublevandi vis, ut planta bicubitalis in tranquillo mari è fundo, arboris ad instar erigatur, ut ex scaphâ observavi. Species hæc perrarò fructifera est.

Accurata admodum observatio in Aët. Linn. v. 3. p. 191. Conservam polymorpham parasitam hujusce speciei pæne exclusivam esse.

Hab. passim.

^a Vid. Tab. x. a, a, a.

^b Vid. Tab. ix. c c.

KNOBBED FUCUS,

PL. x.

OR

Sea Whistles.

FUCUS. frond compressed, dichotomous, imbedded with air-bladders, larger than the stem.

P L A T E S.

Fl. Dan. 146—*Gmel. F.* 1. *B.* 1.—*Hist. Ox.* xv. 8. row, 3, 2.—*Baster.* 11. 5.—*Dod.* 481. 1.—*Ger. emac.* (well expressed considering its being so much reduced). 1568. 6.—*Park.* 1293.—*Reaumur. Aët. Gall.* 1712. t. 2. f. 3.

ROOT discoid, adhering to the rock.

STEM, very long, branched, much compressed; with large oval air-bladders swelling out at intervals; and decreasing in size upward.

LEAVES

LEAVES battledore-shaped, sub-alternate, growing from the edges.

^a FRUCTIFICATION, an oblong, tuberculated fruit, swelling out in the summits of the leaves; with an internal reticulated *mucus*, and round, seed-bearing granules.

OBSERVATIONS.

THIS species is common every where, intermixed with the *ferrated*, *bladder*, and other larger *Fuci*. Its singularly trailing habit, and the large oblong air-bladders imbedded in the substance of, and twice as large as the stalk, serve at once to discriminate it. It generally consists of ^b one or two very long compressed branches rising from the bottom, garnished with leaves coming out of the edges, which are often single, and frequently two or more out of the same socket. These leaves are from one to four inches long; narrow and compressed for the greatest part of their length, and expanding near the summits in a circular form. The height of the plant varies according to its situation: in exposed rocks not exceeding two feet, in deep tranquil water being more than two ells long. The use of the air-bladders in the latter situation is conspicuous; I have passed in a boat over beds of this weed in FALMOUTH Harbour, with their summits near the surface even in deep water and their stems as erect as trees.

The fructification of this species in colour and structure is analogous to that described in ^c the generic character *Fucus*. It is produced in the summits of the leaves, which occasionally, though rarely, fructify. This plant, as well as *F. filiquosus*, is properly *aphyllous*, or leaf-less. The reticulated jelly differs from that of *F. vesiculosus* in the form of the meshes, which are inclined to hexagonal. The seeds, as in the others, are pear-shaped. I cut open some of the air-bladders of different ages; in the growing ones I found ^d threads of a shining transparent substance, with air-bubbles occasionally in them like beads. In the more adult bladders there were none of these threads, but the sides had acquired a great degree of ^e thickness and elasticity so as to be perfect buoys. On the inside there was generally a beautifully embossed net-work.

LIGHTFOOT says, Boys amuse themselves by making ^f whistles of them, from whence its name is derived. I have never seen that use made of them, but they are constantly made into squirts to spout water, for which purpose, the larger ones are admirably adapted by their elastic texture.

^a This Plant fructifies very rarely indeed.

^b This is not always the case: I have seen it regularly alternate branched, the branches shortening as they approach the top as in the fern.

^c See the Preliminary Dissertation, PL. IX. A. A. C. C.

^d See PL. IX. D.

^e There is no doubt that this species, which has the firmest texture of any in the *genus*, acquires a considerable degree of longevity.

^f I am informed from respectable Authority, that the Boys on the river Severn constantly make whistles of them.

FUCUS LOREUS.

TAB. X.

FUCUS. fronde filiformi, compressa, dichotoma, undique, utrinque tuberculata. Linn. S. N.

813.—Raii, Syn. 43. n. 15. (*planta recens è femine*). Hudf. 583.—Lightfoot, 920.—

Schloffer in Gent. Mag. 1756. p. 54.—With. Bot. Arr. 4. 89.—Linn. Tr. v. 3. p. 176.

RADIX

RADIX discoides, ^a cotyledonem fungiformem sustentans.

FRONS è *cotyledone*, dichotoma, crassissima, tuberculata, viscosa.

FRUCTIFICATIO, gelatina, pellucida, flexuoso-retiformis, granulis orbicularibus, feminiferis, per totam frondem.

SEMINA, grandiuscula, pyriformia.

OBSERVATIONES.

Frons Fuci hujus, quæ in plantis vigentibus ferè semunciam lata est, perperam a LINNEO *filiformis* vocatur; in plantis enim recentibus Phaseoli filiquam latitudine, imò et crassitie æmulatur. Substantia viscosa admodum, ^b tuberculis utrinque ordine obliquo per totam superficiem erumpentibus. Tubercula ista apicibus ab initio obferratis, maturo dehinc tempore foraminosis, etiam oculo inermi cernuntur. Mucus hinc feminibus mistis in mare exsudat.

Origo singularis admodum; ineunte æstate rupes, ubi species hæc habitat, plantulis acetabuliformibus operiuntur. ^c Hæ pro Fungis, vel potius Pezizis marinis, a RAYO accipiuntur; harum è medio prodeunt folia bina, crassa, sub-compressa, quæ, intervallis satis longis, dichotomiam perfectè incremento servant, et ad ^d longitudinem trium, vel etiam sex ulnarum aliquando producuntur.

Fructificatio è basi per totam plantam extenditur. Tubercula numerosa utrinque ordine obliquo extùs conspiciuntur, et, si ad lucem spectes, pericarpia orbicularia, feminifera, generi propria, intus sese ostendunt. Portio quælibet tenuis de medio transversim secta gelatinam prorsùs diaphanam exhibet è tubulis, haud quidem reticulatis, ut in *F. vesiculoso*, sed undulatis vel flexuosis compositam. Granula orbicularia, suprâ notata, coloris pallidè fusci, interiori cutis parti adhærescunt. In singulis granulis, semina pyriformia bina, terna, et quandoque sena reperiuntur. Ineunte hyeme ^e tubercula, seu verrucæ pro ratione frondis satis amplæ, oblongæ, opacæ, innatæ haud rarò per intervalla inveniuntur; neque alienum fuerit conjicere hæc è feminibus pullulantibus enasci, et fronde marcescente in Pezizas istas supradictas sese evolvere.

Frons intermedia inter cylindricam et compressam, cujus sectio transversa figuram ovatam, latitudine dimidio minorem longitudine, exhibet.

(V A R. β.)

OCCURRIT var. a D. WOODWARD juxta YARMOUTH observata, fronde latissimâ, irregulari, planâ, internodiis paucioribus, angulis quoque dichotomiæ obtusioribus. Linn. Tr. v. 3. p. 179. NAR-

^a Partem hanc radici, seu basi superimpositam *cotyledonem* nominavi, etsi reverà unica sit, et sui generis. Vid. Tab. x. c.

^b Vid. Tab. x. ff.

^c Vid. Tab. x. e.

^d Intervalla, seu spatia inter dichotomias plerumque pedalia, aliquando cubitalia sunt, internodia tamen hæc in plantis in orientali Angliæ littore breviora esse, totamque plantæ molem ex litteris D. Woodward certior sum factus.

^e Semina aliquando in fronde crescunt, et in tuberculum ovatum ampliantur. Vid. Tab. x. Fig. g g g.



F. nodosus



F. loreus



F. filum

NARROW-LEAVED FUCUS, PL. x.

O R

Sea Thongs.

FUCUS. strap-shaped, compressed, dichotomous, tubercled throughout on each side.

P L A T E S.

Fl. Dan. 710.—*Gent. Mag.* 1756. 64. f. 1. 4.—*Ger. em.* 1565. 5. (*very inaccurate*). *Reaumur. Act.*
Gall. 1712. p. 24. f. 2. *et* 1772. p. 2. pl. 3. f. 14. y.

ROOT, discoid, supporting a cup-shaped ^a base.

FROND, dichotomous with long segments, ovate-compressed, full of tubercles, semi-transparent, viscous.

FRUCTIFICATION, extending through the plant—a transparent jelly with a flexuous network of tubes, and orbicular seed-bearing granules.

SEEDS—largish, from three, to six in each globule. N. B. *These are frequently impregnated in the frond and swell into large knobs.* ^b

O B S E R V A T I O N S.

It seems strange that LINNEUS has applied the term (*filiformis*) thread-shaped to the frond of this species, which, in luxuriant specimens, is nearly half an inch wide. It may, however, be in some measure accounted for from the very unusual contraction of this viscous, spongy plant in drying, and it is well known how many plants were described by him from *Herbaria*. The growth of this plant is so remarkable that in its infant state it was mistaken by a very accurate ^c Botanist for a kind of sub-marine Fungus. The ^d rocks early in the summer seem covered with these little saucer-shaped plants. As the summer advances, they push forth from their centres two; sometimes, though rarely, three leaves, which, at intervals from nine inches to a ^e foot, or more, are regularly forked and divided, and are continued in that perfect dichotomous mode at times to the length of seven yards: the intervals between the forks increasing in length upwards. The frond is thick, and succulent; somewhat between cylindrical and compressed; a transverse slice exhibiting an elliptic figure twice as long as it is wide. It is ^f tubercled on each surface throughout its whole length in an oblique direction, and, when held up to the light, discovers through the skin the orbicular masses of seeds on the inside. When the seeds are ripe, these tubercles have perforations visible to the naked eye, and at those times a thick *mucus* filled with seeds is discharged. If the plant is suffered to dry in the sun or wind, the jelly hardens into pellucid silky filaments, which have been taken

N

for

^a See PL. x. e.^b PL. x. g g g.^c Ray. Syn. p. 43. n. 15.^d See the curious account of this occurrence in Borlase's Nat. Hist. Cornwall, p. 237, and the figure of the *Peziza* at the base of the plant, PL. x. e.^e In vigorous specimens I have seen them four feet long: these *internodia* Mr. Woodward informs me are much shorter on the Norfolk Coast. See Linn. Tr. v. 3. p. 177.^f This plant, when mature, is one of the most proper to be dissected in order to study the mode of fructification peculiar to Genus *Fucus*, as it is considerably larger than in any of the other species. See PL. x. ff.

for ^h pencils of hairs. In order to investigate the fructification, I cut a thin transverse slice out of the frond, and placing it on the field of my compound microscope, I discovered the jelly pellucid as glass, with the tubes not reticulated, but as it were undulated; the orbicular masses were sticking to the interior coat just beneath the external tubercles. The seeds were of a conical shape, larger than any I had observed, and fewer in each globule. I noted RAY's observation on it in its seedling state, as a perfect plant; the same mistake occurs in BAUHINE's History, p. 364, with reference to IMPERATI under the name of mushroom-shaped ^k Fucus. Dr. BORLASE, in his Natural History of Cornwall, p. 237, mentions having actually measured some plants twenty-two feet long. This I have never ascertained, though the tangled masses thrown on the shore, which from the tender texture of the plant it is impossible to unravel, may justify the notion of its being so long.

(V A R. β .)

THE frond quite plain and flat, very irregularly varying from half an inch to an inch and half in width: the divisions fewer and the angles of the dichotomy very obtuse. Found at YARMOUTH. Linn. Tr. v. 3. p. 179.

This singular variety has been noticed in the Memoirs of the Royal Academy at Paris, 1772. v. 2. Pl. 4. f. 18.

Hab. Geer Rock, PENSANCE, and elsewhere plentiful.

^h See With. Bot. Arr. v. 4. p. 96. This happens to the fruit pods of the bladder, *ferrated*, and other *Fuci*; and it is the induration of the same jelly exuding through the orifices of the imbedded vesicles in the frond of the above, and some other species, which has been mistaken for pencils of hairs—the *filets courts* of Reaumur, but without *antheræ*.

ⁱ From three to six in each granule.

^k *Fucus fungularis*.

F U C U S FILUM.

TAB. x.

FUCUS. fronde filiformi, simplici, longissimâ, inflatâ, sub-pellucidâ.

Linn. Sp. Pl. 1631.—*Raij, Syn.* 40. 3.—*Hudf.* 587.—*Lightfoot.* 963.—*With. Bot. Arr. v.* 4. p. 108.

—*Linn. Tr. v.* 3. p. 193,

RADIX discoides, tenuis.

FROND, simplex, longissima, inflata, futurâ spirali, dissepimentis? ad intervalla.

FRUCTIFICATIO, gelatina, pellucida, tubulis flexuosis, bullisque aëris intus.

SEMINA, fine granulis; minutissima, glomerata, interiori cutis superficiei affixa.

O B S E R V A T I O N E S.

“Fucus teres, prælongus Chordam referens,” aptissimè a RAYO nuncupatur planta hæc; utpote quæ non solum longitudine, et formâ, sed etiam pellucidate habituque crescendi intorto *chordam musicam* refert. Minus ap-
tè

tè “subfragilem” vocat LINNEUS, nulla enim species, recens, tenacior; etsi ad solem dealbata, vel in Herbario exsiccata fragilis evadat. Filum Germanicum BAUHINI (Prod. 155), et BOCCONIS (Mus. 271.), diversa videtur species “pluribus ex eâdem basi provenientihus filis, nigricantibus, et inter se complicatis.” Notandum est plantam hanc juxta basin valdè exilem esse, itemque ad apicem etiam attenuatam. Longitudine *Fuco loreo* par est; in Portu FALMOUTH dicto usque ad septemdecim pedes, ut ipse expertus sum, accedit. A nemine, ut scio, observata est cuticula per totam longitudinem spiræ ad modum contorta; futurâ etiam spirali, quæ etsi minùs costâ aliquâ exteriori evidens sit, plantâ tamen ad lucem suspensâ, vitroque modicè augenti investigatâ, cuivis facillè patebit. Apparent ad lucem etiam nudo oculo dissepimenta, globulique aëris passim et sine ordine. ^a Dissepimenta hæc, etsi fibris capillaribus intertexta, nihil attinent ad fructificationem: vapor elasticus intus inclusus, forsân mediantibus hisce, intra certos fines cohibetur. Internâ hâc partium structurâ planta hæc omnium forsân maximè elastica, antequam a rupibus vi fluctuum avellatur, nusquam non sine nodo, et rectè sese extendit. Fructificatione genericâ *Fuci* in Præfatione stabilitâ, ex charactere suprâ notato necesse est plantam hanc *genus* novum constituere. ^b Gelatina interior, fibrarum capillarium texturâ, bullis quoque aëris immixtis primo aspectu diversa est; defunt etiam granula intus, seu pericarpia orbicularia, feminifera, necnon tubercula, vel papillæ in superficie, foraminibus ad apices. Vitris tamen compositis, et maximè augmentibus, ^c feminula minutissima rotundiuscula, glomerata, interiori cutis superficiei affixa detexi. Color olivaceus, superficies lubricissima.

Hab. In Portu FALMOUTH, et passim.

^a Accuratissimi Botanici frustra hæc quæfivere, et pro certo tenuissima sunt, et quasi evanida; cuti adeo tenaci inclusa ut difficillimum sit frondem sine injuriâ diffecare. Sæpius tamen fila quædam implicata, partem, ut sum suspicatus membranæ cujusdam retiformis, ad intervalla transversim protensa observavi: et ratio quidem postulat vaporem intus elasticum internodiis quibusdam contineri.

^b In Tab. Syn. p. xxiv. *Chorda* nuncupatur.

^c Vid. Tab. x. *b.* portionem plantæ maximè auctam. *c c* Tubulos flexuosos unâ cum aëris bullis. *d d d* Seminula glomerata.

THREAD FUCUS, PL. x.

OR

Sea Laces.

FUCUS. frond thread-shaped, very long, elastic, semi-transparent.

P L A T E S.

Fl. Dan. 821.—Pet. gaz. 91.5. (“SUSSEX SEA STRAW.”).

ROOT discoid, thin, small.

FROND cylindrical, single, very long, twisted, inflated; parted internally by diaphragms?

FRUCTIFICATION, a transparent mucus with tubes wreathed, and twisted with numerous imbedded air-bubbles.

SEEDS, extremely minute, naked, clustered; adhering to the inner coat.

OBSER-

OBSERVATIONS.

THIS Plant, notwithstanding its^a internal partitions, has no affinity with genus *Conferva*. The use of these I conceive to be to confine the air, or elastic vapour within certain spaces, which seems quite necessary in a plant which is extended to such an^b amazing length, as likewise to increafe its buoyancy, which is so considerable, that I have seen it in tranquil waters pointing upwards like a reed. Its elasticity is such in a growing state, that it never entangles itself, as we find to be the case when thrown on the beach. From hence it may be inferred that LINNEUS when he inserted the terms "*sub-fragilis et opaca*"—*brittle and opaque*, must have described from dry specimens, and it is equally probable that PETIVER's plant^c *The white Suffex Straw* was no other than a specimen bleached, as we often find it by the sun, or wind. The whole plant consists of a tough, pellucid, and very slippery skin covering a transparent colourless jelly, which is much thinner than that observed in the genus *Fucus*. This jelly is composed of very fine capillary vessels, beautifully wreathed, and twisted, with numerous oval air-bubbles. This is discoverable in a thin transverse slice with high magnifiers, or by removing the skin lengthways. The^d diaphragms, or partitions, discoverable by holding the plant to the light, are at unequal distances, from one inch and an half to two inches, or more: they consist of a reticulated transparent membrane with pellucid threads, containing air-bubbles, stretched across. Towards the extremity these partitions are wider apart, and the jelly seems more clearly fibrous; so that it appears, as if the impregnation began at top and the ripe seeds were discharged by the decay of the plant, as no external tubercles, or *papillæ*, were discoverable with minute holes for the discharge of the seed. The inside coat is striated lengthways, and the whole plant on being held to the light has a spiral growth, and not unfrequently a future may be seen even without an eye-glass, though there is no external protuberance to mark it. From what has been said of the mode of fructification, it is evident that this plant must be separated from genus *Fucus*.^e

^a See the note subjoined to the Lat. Obs. and the doubts concerning the existence of these *septa*.

^b I have measured it seventeen feet long.

^c *Ligula alba Suffexiana*. Pet. Gaz. 91. 5.

^d I will not affirm that these are actual septa or divisions, as Mr. Woodward, whose accuracy cannot be disputed, found on dissection only rings on the inside. The supposed membrane I conceived to be of the thinnest texture, and consequently extremely difficult to detect; but I have repeatedly observed pellucid strings extending across from the inside of the rings and intersecting each other, and I think it is fair to suppose there must be some divisions to confine the elastic vapour which seems necessary to distend the plant.

^e It is arranged as Genus *Chorda* in the Syn. Tab. p. xxiv. It is singular to observe how nature can effect the same purposes by different means. In this species and the preceding every end of buoys is answered by the general inflation and elasticity of the whole frond.

FUCUS SILICULOSUS.

TAB. XI.

FUCUS. fronde compressâ, ramosissimâ, flexuosâ; fructu oblongo, acuto. *With. Bot. Arr.*
v. 4. p. 88.

(*Species nova?*)

RADIX, irregularis, discoides.

CAULIS, compressus, flexuosus, subtus nudus; hinc inde foliorum vestigiis, acetabuliformibus.

FRUCTIFICATIO—Generi *Fuco* propria; in fructu filiquoidi inclusa.

SEMINA, pyriformia; plurima in singulis granis.

OBSER-

OBSERVATIONES.

SPECIES hæc haud rarò occurrit in littore occidentali. Habitùs similitudine, utpote junior *F. filiquoso* planta, vel faltem varietas ejus minor, diu a me prætermiffa est. Interiorem tandem filiquæ ementitæ partem cultello recludens, studio femina in hâc specie tam diu desiderata investigandi, fructificatio ex improvifo mihi sese obtulit, gelatinâ tubuloso-reticulatâ, granulisque intùs feminiferis constans. Nulla intùs loculumenta, nulli extùs fulci transversi; ^a fibræque longitudinaliter in vacuo protensæ omninò defuere. Habitus plantæ, ut supra notavi, *F. filiquoso* totis partibus minor, neque adeo in longum protensa. E basi crassiusculâ, subtùs planâ, semipedalis, aut vix suprâ affurgit, ramis pluribus, compressis, flexuosis, et ad margines ^b nodosis. Siliculæ, si ita dicam, ex omni parte producuntur, brevioribus petiolis infidentes, acuminatæ, sed minimè rostratæ. ^c Gelatina intùs sub-pellucida, microscopio subjecta, tubulorum capillarium reticulationem pulcherrimè exhibet; maculis tamen retium perexiguis, et non nisi vitro maximè augenti conspiciendis.

Hab. Pridmouth et Polkerris juxta Fowey, et alibi in CORNUBIA.

^a Vid. Fasc. I. p. 9. et Tab. v. f. a.

^b Tubercula, seu potius nodi in margine caulis, sunt acetabula foliorum, vi fluctuum avulforum, seu sponte suâ cadentium.

^c Vid. Tab. XI. f, f. nat. mag. ff. auct.

BASTARD-PODDED FUCUS.

PL. XI.

FUCUS. compressed, much branched, flexuous; fruit oblong, sharp-pointed.

(*New Species.*)

ROOT, irregularly discoid, fleshy.

STEM, compressed, flexuous, with hollowed protuberances at the edges, being the sockets of former leaves.

FRUCTIFICATION, a reticulated pellucid jelly with seed-bearing granules, inclosed in an oblong capsule or fruit.

SEEDS, numerous, pear-shaped.

OBSERVATIONS.

THIS Species had been often noticed by me, and the specimens as constantly taken for younger plants, or at farthest, as a dwarf variety of the Podded *Fucus* ^a, the individuals of which I then observed, varied so exceedingly as to induce the belief of two separate species. Dissection, however, discovered the mistake, as the supposed pod of the species under consideration, on being cut open, discovered the appropriate fructification of *genus Fucus*, while

O

all

^a Fasc. I. p. 9.

all my attempts to discover seeds in the pods of the former have been hitherto^b fruitless. The jelly in this species, though transparent, is not entirely colourless: it has a brownish hue, and the^c network of capillary tubes through a strong magnifier appears much smaller than any of the *genus* which I have examined, as are likewise the globular masses, and the seeds contained within them. This plant is by no means so trailing as the *podded Fucus*. Its general height never exceeds nine inches, with numerous flexuous branches, so as to form a bushy plant. Its colour is a yellowish brown: the^d fruit cylindrico-compressed, sharp-pointed, and not marked with transverse furrows. It exhibits when ripe very minute external tubercles, if examined under a microscope.

^b I have lately been favoured with specimens of *F. filiquosus* *in fruit* from a very ingenious Correspondent and most intelligent marine Botanist, Dawson Turner, Esq. of Yarmouth, Norfolk. They do not swell out from the pods, but are appropriate seed-vessels, so that the pod-like leaves with their curious internal structure serve no other purpose in all probability but that of *buoys*; unless, as seeds have been said to have been actually discovered in the terminating bladders of some of them (Linn. Tr. v. 3. p. 126.), we may conjecture that these pods fructify in an early stage, and discharge their seeds, and afterwards expand with all the curious apparatus noticed in the former Fasc. p. 9. to give buoyancy to the frond.

^c See Pl. XI. f. ff. magnified.

^d These leaf-like pods come out on all sides of the plant: before impregnation they are compressed, as in many of the species.

F U C U S TAMARISCIFOLIUS. TAB. XI.

FUCUS. fronde ramosissimâ, sub-tereti; foliis subulatis; terminalibus, confertis; vesiculis ovatis foliosis in caulis medio. *Herb. Linn. Buddle. p. 18. n. 2. 19. n. 2. 5.—Petiv. p. 40. n. 3.—Huds. 576.—Gmel. 128?—With. Bot. Arr. 4. 86.—Linn. Tr. v. 3. p. 130.*

RADIX, irregularis, callosa, agglutinata.

CAULIS, ramosus, subteres, scaber, ad basin nodosus.

RAMULI, subteretes, longitudinaliter fulcati; foliis subulatis, basi incrassatis, sursum tendentibus; inferioribus deciduis.

FRUCTIFICATIO, mucus tubuloso-reticulatus, granulis feminiferis, internus: scutellis externis, acetabuliformibus; fibris ad oras radiatis.

SEMINA minutissima.

O B S E R V A T I O N E S.

PLANTA hæc a LINNEO, RAIJ, ut videtur, auctoritate *F. ^a ericoidis* nomen obtinuit, et aptissimè sub characteri *F. "hirti"* describitur; tactu enim aspera est, et pænè manum lædit. E basi crassâ spongiosâ caulis exit sub-teres, pennæ olorinæ magnitudine, et fruticuli ad instar ramosissimus; internè subnudus, supernè foliolis acutis, conicis, quandoque bifidis, obsitus. Tubera, vel nodos oblongos, solidos juxta basin haud rarò cernere est. ^b Vesiculæ *oblongæ*, diaphanæ, *foliosæ*, juxta summitates inveniuntur: notandum tamen est hæc in plantis junioribus omninò

^a *Fucus filiformis, ramosissimus, hirtus.* Linn. Sp. Pl. 1631.

^b Vesiculæ hæc quandoque vacuæ; sæpiùs tamen, mucò quodam fructifero, ut suspicor, repletæ sunt. Descriptio Gmelini vesicularum in *F. abro-*

omnino deesse. Extremitates ramulorum tempore maturo obtusæ et quasi imbricatæ: in his sita est ^c fructificatio gelatinâ reticulatâ, granulisque, feminiferis constans. Acetabula, ad instar Lichenis scutellorum, ad basin foliorum in apicibus cernuntur, ^d tubulos pellucidos radiatim dispositos sub aquâ protrudentia. Altitudo plantæ pedalis aut suprâ, substantia caulis intus mollis et spongiosa, unde frequenter *Fucis*, *Confervis*, itemque *Zoophytis*, pænè tota obruitur. Species hæc omnium fere maximè variabilis est: notavimus suprâ vesiculas aliquando deesse. ^e Folia in junioribus juxta basin omninò plana sunt et lanceolata. Summitates etiam variant. Steriles foliis paucioribus, et ad basin gracilioribus instructæ; fructiferæ autem turgidulæ, foliis numerosissimis basi tuberculiferis quasi imbricatæ cernuntur. Apicis fructiferi lobus longitudinalitèr sectus fructificationem ^f ostendit. Ramulus *a*, paulùm auctus colorem plantæ vigentis sub aquâ adumbrat. Color cœruleo viridis a D. Velley observatus in vigentibus plantis è muco quodam, seu vernice, si ita dicam, superficiem oblinenti oritur, et, plantâ madidâ, etiam extra aquam conspicuus est.

tanoidi singularis admodùm “ bullæ aëriæ ipsi ramorum, ramulorumque medietati implantatæ, globosæ, oblongæ . . . foliolis multifidis plerumque terminatæ.” GM, p. 89. *F. tamarisc.* apicem statu maturo mirè designat, et quasi sub oculis ponit vir clarissimus. Conferantur specimina fructificantia cum specimine D. LEONING in Herb. Linn. Observandum est vesiculas in *F. ericâ marinâ*, mininè in caule immerfas, ut in *F. tamarisc.* sed “inter ramos ramulosque provenire, singulasque proprio pedunculo insistere,” unde necesse est concludere *F. mediterraneis* GMELINI descriptionem, et iconem esse, ut ipse etiam innuit. GMEL. p. 128.

^c Tab. XI. *kkk.*

^d Tab. XI. *l, l.* acetabula cum tubul. radiat.

^e Vid. PL. XI. *m, m.*

^f Vid. PL. XI. *kk.*

TAMARISK-LEAVED FUCUS, PL. XI.

OR

Sea Tamarisk.

FUCUS. frond roundish, much branched, thick-set with awl-shaped leaves, and leafy, innate air-bladders.

P L A T E.

Gmel. 11. 2? (*faulty, especially with respect to the fructifying summits.*).

ROOT, irregular-shaped, fleshy, very tough.

STEM, roundish, large, knobby, with bulbous swellings at the base.

BRANCHES, numerous, thick-set with short awl-shaped leaves pointing upwards.

FRUCTIFICATION in the summits: a reticulated mucus, and orbicular seed-bearing grains, with external *scutella*, and radiated pellucid tubes.

SEEDS, very minute.

OBSERVATIONS.

HUDSON has introduced confusion into this species by his synonyms, and the plant is likewise of so varying a nature, with respect to its different states of growth, that it has added considerably to it. It is a common

mon plant on the S. West Coast, though from the silence of LIGHTFOOT it seems to be unknown in the North. The Species described by J. and C. BAUHINE are different from each other, and both probably from this under consideration, while LINNEUS's ^a *F. ericoides*, most probably described from BUDDLE's *Herbarium* and expressly referring to RAY, has been overlooked in the English Catalogues. The habit of this species is like that of a bushy shrub with a thick knobby trunk, and there are bulbous solid swellings in the stem, and at the setting on of the branches, which, as they are generally garnished with young shoots, serve, probably, as one mode of propagation. The height of the plant is from six inches to a foot: its branches immediately above the base. The upper branches in the full grown plant are round, thick-set, and almost tiled with short spinous leaves, large at the base, pointing upwards, and often bifid. In the younger plants the leaflets are not so closely set, and many of the young branches are leaf-less, flat and lanceolate. No imbedded bladders, or swellings of the summits, are visible in this early state; but, when preparing to fructify, the summits assume a granulated appearance, which, on being magnified, is found to consist of an ^b oval imbedded bladder and five or six pitcher-shaped terminating lobes, which on dissection discover the proper fructification of the *genus*. In this flourishing state this *Fucus* assumes those beautiful changeable tints noticed by Major VELLE: they are of a faint bluish green visible not only under water, but when the plant is wet; and, when nicely viewed, seem like a slimy mucus, or varnish. At times are seen imbedded ^c cavities like the faucers of a Lichen at the bases of the leaves, and these under water emit radiated fibres: whether this is an animal of the *Flustra* kind, I have not been able to ascertain; but this *Fucus* has a Marine Insect of the genus *Scolopendra*, which ^d feeds on it, and makes a lodgement, or cell with various apertures, the whole length of the lower branches. This insect is furnished with finny appendages, at the ends of its numerous feet, as is the case with many of the marine *Vermes*, and is I fancy a *non-descript*. Length, an inch; thickness, the size of fine packthread.

^a The above having been written many months before the appearance of the Linnean Transactions, Vol. 3. it gave me great satisfaction to have my opinion confirmed, and I should with equal pleasure have adopted the trivial name, if my Plate, had not been already engraved and the copies worked off.

^b See PL. XI. *a*, a branch somewhat magnified; *i, i*, the bladder; *k, k*, the summit magnified. See also what I observed in the remarkably expressive character of the *bullæ aëriæ*, as Gmelin calls them, which are imbedded in the branches of *F. abrotunoides*. From the vigorous state in which I have seen this plant, when fruiting, and before it shrinks in drying, I should be strongly inclined to think Leosling's Plant in the Linnean *Herbarium* belongs to this species. The bladders in fruiting Plants are not confined to the summits. See my Observations on GME-LIN's *F. erica marina*, on the other side, which certainly is not this species.

^c See PL. XI. *l, l*.

^d The Entomologist will be pleased to see this affinity in a marine insect with many of the land insects, which are attached to particular species of vegetables for their food.

F U C U S OSMUNDA.

TAB. XI.

FUCUS. fronde cartilagineâ, compressâ; ramis dentato-pinnatifidis; marginibus callofis. *Petiv. p. 25. 1. 2.*—*Raij, Syn. p. 48. n. 37.*—*Gmel. p. 155.*—*Morif. Hist. Ox. 646.*—*Huds. 473.*—*Lightfoot, 954.*—*With. Bot. Arr. v. 4. 106.*—*Linn. Tr. v. 3. 167.*

RADIX discoides, agglutinata.

CAULIS, in frondem filicinam sese expandens.

FRONS pinnatifida; apicibus segmentorum, obtusis, callofis.

FRUCTI-

FRUCTIFICATIO ^a immerfa, terminalis; è muco pellucido retiformi constans.

SEMINA, minutissima, glomerata, nuda.

OBSERVATIONES.

SPECIES hæc ætate maturâ perelegans a PETIVERO dudum observata est sub nomine "*F. Dealenfis* pedicularis rubræ folio." Satis aptè a D. GMELIN *F. osmunda* nominatur: specimen tamen haud ita luxurians ac apud nos reperitur icon ejus t. 16. f. 2. representat: Descriptio fanè specifica apud D. HUDSON *F. pinnatifidi* et *F. filicini* minus aptè, ut opinor, discriminatur; unde D. LIGHTFOOT scrupulus an sint species diversæ. ^b Re verâ autem, si specimina inspicias, discrimen fati magnum evidentè apparebit. Speciosa admodum est frondis forma, et floridam *Osmundæ regalis* apicem haud malè referens, unde nomen GMELINI. E basi tenui, discoidi, caulis affurgit compressus, brevis, in folia tria, quatuorve filicina definens. Folia pinnatifida, marginibus flexuosis, callosis; apicibus etiam segmentorum obtusis. Altitudo plantæ sexuncialis; latitudo foliorum vix semuncialis; substantia tenera et enervis, et proculdubiò edulis; ^c color fusco-purpureus. Fructificatio, etsi nunquam a D. LIGHTFOOT visa, in apicibus segmentorum sita est. Semina numerosissima, coccinea, gelatinâ pellucidâ obducta, si cultello apices recludas, microscopii ope facillimè deteguntur. Foraminulas etiam perexiguas in superficie sine tuberculis lente maximè augenti cernere est; odor iste, seu sapor, ^d piperis in hac specie prorsus desideratur. In Catalogo D. D. GOODENOUGH et WOODWARD nuperrimè mihi in manus tradito species hæc, ^e *F. pinnatifidus* audit: synonymis sc. *F. pinnatifidi*, *multifidi*, et *filicini* nostratium in unum redactis.

^a Forfan ætate maturâ tubercula externa cernenda sint.

^b Subdubitat Auctor prædictus, feminibus *F. filicini* nunquam à se detectis, annon *F. osmunda* sit P. mascula, *F. pinnatifidus* autem P. femina ejusdem speciei.

^c Specimina in Herbario D. Woodward occurrunt coloris rubri, et viridis.

^d Vid. quæ de sapore piperis differui, Obs. Ang.

^e Vid. Linn. Tr. v. 3. p. 167.

OSMUNDA FUCUS,

PL. XI.

OR

Sea Fern.

FUCUS. frond, gristly compressed, trebly winged; segments callous, blunt.

P L A T E S.

Gmel. t. 16. 2. (a branch).—Moris. Hist. Ox. xv. t. 8. f. 2.

ROOT, discoid, flat, small.

STEM flatted, short, branching into two or three fern-shaped leaves.

FROND, winged-cleft, with the margins and tips of the segments callous, obtuse.

FRUCTIFICATION in the inside of the tips of the segments: consisting of a vascular pellucid jelly, with numerous minute seeds:

P

OBSER-

OBSERVATIONS.

THIS Species, the *F. osmunda* of GMELIN, has been considered as a variety of the *F. pinnatifidus* of HUDSON, the *jagged Fucus*, or *Pepper Dulse* of the Scotch. It differs, however, from that species in not growing in matted clusters, in being considerably larger and more elegant in the cut of the leaves, and in not possessing that peppery, aromatic taste and smell so peculiar to that species. From a comparatively small base or disk, one, or more compressed stems arise, which expand into beautiful fern-shaped leaves. The height of the plant is about six inches, the breadth of the frond hardly half an inch. Its colour is a ^a dark, transparent purple: its substance is tender, and its texture veinless, and it is undoubtedly an eatable species. The fructification is ^b internal and imperceptible, residing in the tips of the segments. There are, indeed, extremely minute perforations like ^c pin-holes, without any protuberances, discoverable at certain stages of the plant's growth with the assistance of high magnifiers. In the enumeration of the British *Fuci*, so often referred to in this FASCICULUS, *F. osmunda* is included, together with the two varieties which form the subject of the subsequent article, under the general name of *pinnatifidus*. These Gentlemen are silent as to the smell and taste of pepper recorded by LIGHTFOOT under *F. pinnatifidus*, and from their known accuracy so uncommon a circumstance would not have escaped them. I have therefore no doubt but *F. osmunda* will retain its place as a separate species.

Hab. Portland Island, Penzance, and the S. W. Coast.

^a The colours in this species vary much.

^b The fructification in my specimens was imbedded, and only discoverable by the knife. It is probable from analogy and from the observations in the Linn. Tr. v. 3. p. 187. that at advanced periods of maturity there may be external tubercles.

^c I have noticed these minute perforations on the surfaces of the smoothest fronds discoverable by very high magnifiers, and supposed them intended for the discharge of the seeds: they may, however, be only the perspiratory ducts, the *spiracula foliorum* of HEDWIG. Theor. p. 17. See also G. C. REICHEL *de vasis plantarum spiralibus*, and the Dissertations of MALPIGHI and GREW.

FUCUS PINNATIFIDUS.

TAB. XI.

FUCUS. fronde angustâ, ramosâ, compressâ; ramis subalternis divaricatis; ramulis obtusis brevibus.

RADIX discoides, repens.

CAULIS, compressus, angustus.

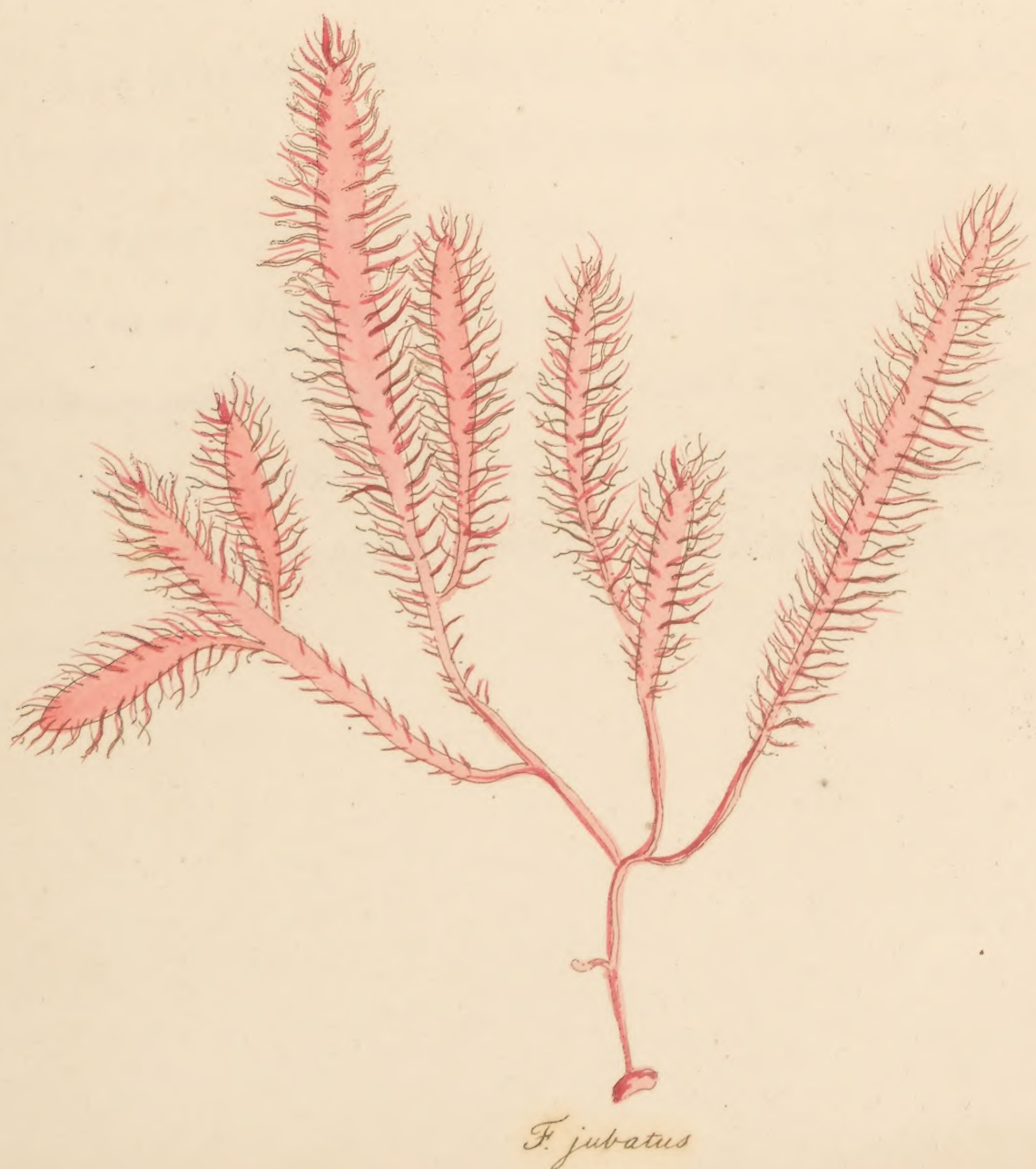
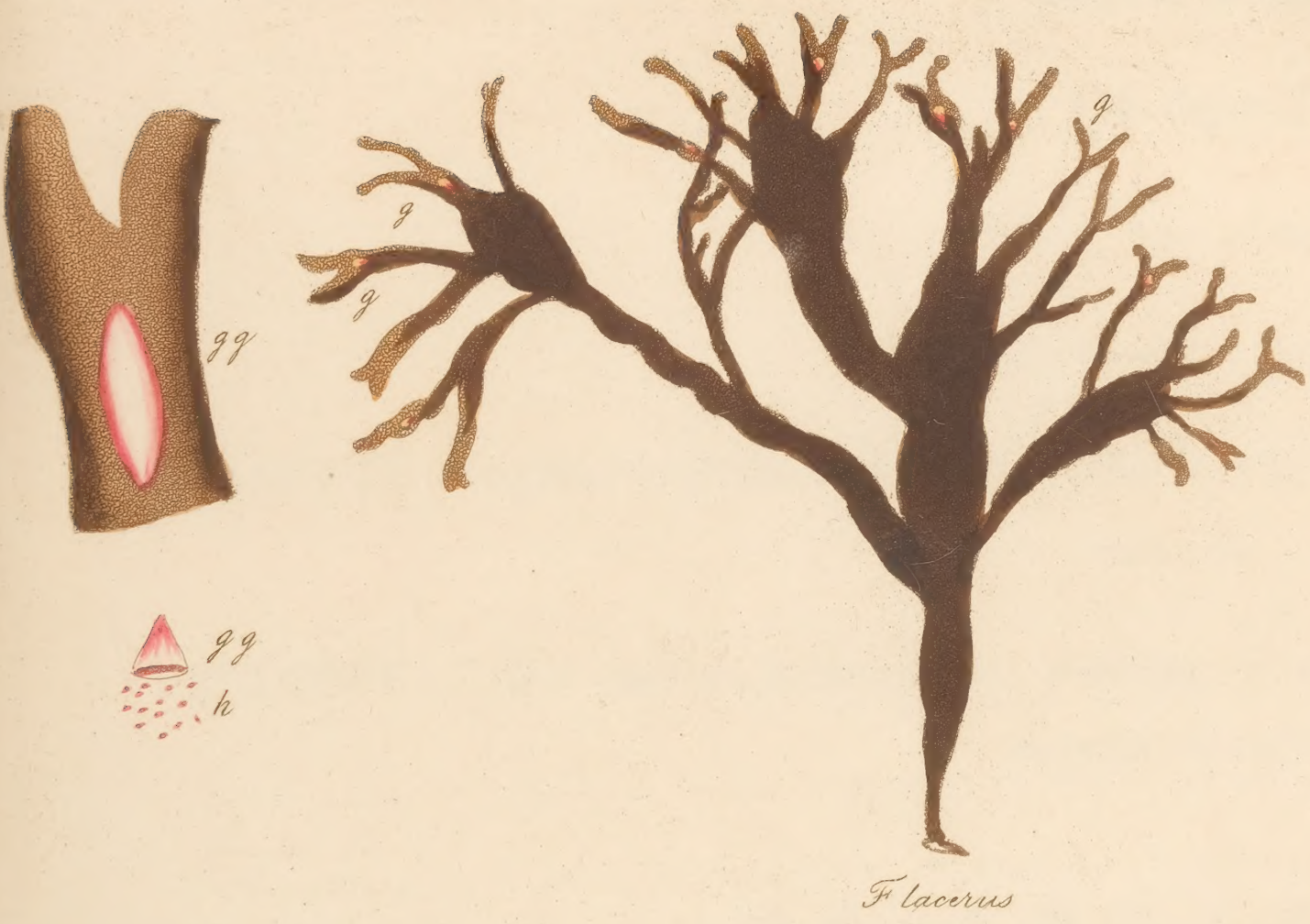
RAMULI, divaricati, irregulares; sæpiùs sub-pinnatifidi; pinnis ad latera obtusis, callosis, succulentis instructi.

FRUCTIFICATIO in pinnis, è muco pellucido interno, tuberculisque externis globosis constans.

SEMINA minutissima, nuda.

OBSERVATIONES.

FRONS in hac specie secundum D. LIGHTFOOT variat mirabilitèr, vel filiformis, vel semuncialis; si non revera sint species distinctæ. Planta hæc parasitica est, caulibus *F. digitati* aliorumque molis grandioris adnascens; altitudinis



titudinis triuncialis, aut suprâ. Rami divaricati et quam maximè irregulares, pinnulis ex utroque latere obtusis, et plerumque fructiferis obfiti. Ætate maturâ ^a tubercula in pinnulis hisce cernere est, fructificatione intùs in muco pellucido; feminibus glomeratis, nudis.

(V A R. β.)

VARIETAS hæcce apud nos vulgatissima est. Rupes, musci ad instar operit, cæspite densissimo, altitudinis tamen vix uncialis. Frons complanata, et filicina est: substantia, æquè ac prioris, tenera et pellucida: odor et gustus idem. ^b Fructificatio in pinnulis, ut in priore, sed sine ^c tuberculis. Pars interior pinnularum muco pellucido anastomosante, retiformi, feminulisque minutissimis, nudis, constat.

Hab. passim; in scopulis propè Acton Castle, et ad oppidum Pensance collegi. In Scotiâ, D. LIGHTFOOT.

^a Vid. Tab. XI. *bb.* pinnula cum tuberculis auct. *c* ejusdem apex transv. sect. *d* feminula cum muco in vitrum effusa. *e* pinnula incipiens aucta.

^b Vid. Tab. XI. *a* summitas nat. mag. *aa* eadem aucta, cuticulâ abrasâ.

^c Ætate maturâ forsan tubercula reperiuntur.

JAGGED FUCUS,

PL. XI.

O R

Pepper Dulse.

FUCUS. frond narrow, compressed: branches sub-alternate, divaricated: with short obtuse callous shoots.

(No Figure.)

ROOT flat, creeping.

STEM, narrow, compressed.

BRANCHES irregular, sometimes inclining to pinnatifid, with short, blunt, fructifying *pinnæ* sub-alternate on each side.

FRUCTIFICATION internal, in the *pinnæ*; consisting of naked seeds in a reticulated, pellucid *mucus*; with external tubercles.

OBSERVATIONS.

THE varying habit of this Plant, noticed formerly by Mr. LIGHTFOOT (Fl. Scot. 954.) induces me to give two distinct representations of it: differing, however, so widely that they may well pass for distinct species. They have a great similarity in the succulency and tenderness of their texture, and in the strong aromatic smell, which, as far as my observations on sea plants extend, is *unique*; and, as it emits this uncommon and disagreeable odour on being handled ever so lightly, it could not have escaped the notice of Messrs. GOODENOUGH and WOODWARD. This plant, figured as Var. α. is irregular and straggling, about three inches high, sufficiently described above with the assistance of the drawing. It is I believe generally a parasitical plant, growing on the stems of the larger *Fuci*.

VAR.

(V A R. β .)

THIS variety is very abundant and covers the rocks in wide patches, creeping like a *Lichen*. It is a matted, creeping plant, of no considerable height, probably owing to its exposed situation: it is seldom higher than it is represented in the Plate. Its frond is flat, and of the same texture and smell with the preceding. Its branches are produced nearly opposite and at right angles, diminishing in length upwards. It appears much eaten by the small fry of fishes. Its fructification is always discoverable by the knife, and may probably at times break out in small tubercles.

Hab. Acton Castle Rocks and elsewhere on the Cornwall Coast.

F U C U S LACERUS.

TAB. XI.

FUCUS. fronde cartilagineâ, dilatâtâ, enervi; laciniis inæqualibus profundis; apicibus bifidis; tuberculis innatis. *Raij, Syn.* 44. n. 16.—*With. Bot. Arr.* (F. membranifol. var. β . *absque Synonymis.*) v. 4. p. 106.

RADIX, tenuis, discoides, plures emittens caules.

CAULIS, cylindrico-compressus, statim sese expandens.

FRONS, expansa, segmentis profundis, angulis segmentorum acutiusculis.

FRUCTIFICATIO, pericarpium innatum, ovatum, rigidum.

SEMINA, minutissima in muco pellucido.

OBSERVATIONES.

FUCUS hic, varietas *F. ceranoidis*, D. GMELIN et RAY (vid. *Syn.* p. 44. n. 16.), in *Systemate LINNEI* *F. crispus* audit. Quum habitûs sit maximè omnium irregularis, laciniis inæqualiter incisis, et quasi *laceratis* BUDLEII nomen "*laceri*" pro triviali sumpsi. Caules plurimi ex eodem disco oriuntur ad basin cylindrico-compressi, angusti, statim sese expandentes. Frons, ut suprâ descripta, et in icone delineata, enervis, ^a sub-pellucida; altitudinis triuncialis. Color frondis purpureus, vel brunneus. Juxta apices ^b tubercula, vel pericarpia solitaria, immerfa, et utrinque prominentia tempore maturo cernuntur. Species, vel varietas altera sub nomine Linneano *F. crispi*, in sequenti Tabulâ icone illustratur, et protinus describenda est.

RAGGED

^a Texturâ cartilagineâ et pelluciditate distinguendus est *F. ceranoides* secundum D. GMEL. p. 116. "Evidenti pelluciditate gaudet in omnibus speciebus, in quibusdam verò evidentiori."

^b Vid. Tab. XI. g, g. nat. mag. gg. auct. et transversim sect. cum feminibus. Minus accurata GMELINI fructificationis descriptio, speciebus verrucosis, ut videtur, propria: quæ, incipiente fructificatione ligulas vel mammillas in fronde convolutas ostendunt.

RAGGED FUCUS.

PL. XI.

FUCUS. frond cartilaginous, expanding, veinless, sub-pellucid: segments unequal and deeply cut in; summits bifid, with imbedded pericarps.

(No Plate.)

ROOT thin, discoid, sending up many shoots.

STEM compressed, narrow, gradually expanding upwards.

FROND widely expanded, with ragged, deep segments: the angles not rounded.

FRUCTIFICATION, an oval, imbedded, rigid tubercle, prominent on either surface.

SEEDS very minute in a clear mucus.

OBSERVATIONS.

It is surprising to observe the confusion which has crept into the species called *F. ceranoides* in our Catalogues from the transposition of that familiar name by LINNEUS to a different plant. GMELIN, who has retained the name of RAY, says it is not less sportive in its habits than *F. vesiculofus* (p. 116.) it therefore needed not the insertion of a different species to add to the uncertainty. The errors, however, in the synonyms may have arisen in some measure from the different acceptation of the Latin Term, ^a *ceranoides*; some applying the resemblance alluded to, to the shape of the frond, and others to its texture. The *Fucus* here represented is by no means so much lacinated at the edges as GMELIN'S *F. ceranoides* (tab. 7. f. 1.), nor are the angles of the segments so much rounded; but the characteristics, which under all its varied forms serve at once to distinguish the species, are *texture* and *fructification*; in which latter respect the Author above cited has not been so happy, as he supposes the globules of seeds, *adnate*, or *agglutinated*, instead of being imbedded; taking the character from the *mammillose* and *warty* specimens when young, which I imagine is only a proliferous, or luxuriant quality depending on circumstances, especially as my *F. crispus*, var. Tab. XII, discovers proliferous, compressed, bifid ligaments coming out from the surface of the frond, with the imbedded pericarp ^b *prominent on either side*. It is necessary to caution the Reader against confounding this Species with *F. laceratus* of GMELIN and the LINN. Tr. v. 3. p. 155.—N. B. This arranges in the Table under genus CHONDRUS. See the Syn. Tab. p. xxiv.

Hab. Mounts-Bay, CORNWALL.

^a *Ceranoides* from *Kegus*—Cornu, resembling horn or an antler of a Deer.

^b See Tab. XI. g, g. nat. size. g g. magn.

FUCUS JUBATUS.

TAB. XI.

FUCUS. fronde membranaceâ, ramosâ, lanceolatâ; margine superficieque ligulatis; ligulis ramosis. *Act. Soc. Linn. v. 3. p. 162.*

RADIX, tenuis.

CAULIS, subtus angustus, compressus; fursum se dilatans.

Q

FRON

FRONS, membranacea, enervis, lanceolata; undique utrinque ligulis ramosis obfita.

FRUCTIFICATIO, tubercula? in fronde immersa.

SEMINA, incognita.

OBSERVATIONES.

HAUD rarò occurrit in littoribus nostris perelegans hæc planta *F. ciliati* affinis, diversa tamen; cilia enim, feu mavis ligulæ, prælongæ sunt, et frequentius ramosæ, è margine, itemque ex superficie frondis erumpentes. Ex basi tenui, ^a furculos emittente, caulis exit compressus, sensim sese dilatans: folia è caule exeunt tria, quatuorve, angusta, lanceolata. Textura lævis, membranacea: color saturè rubens: altitudo triuncialis vel suprà. Nulla fructificationis in ligulis vestigia; in fronde tamen aliquandò cavitates orbiculares, scutellis Lichenum haud abfimiles, ^b notavi. Semina hætenus latuere. *F. jubatus* ^c icone pereleganti ex quo incisa est Tabula nostra in lucem prodiit. In littoribus nostris specimina pari magnitudine nunquam adhuc repperi, neque ciliis adeò in longum effusis. Forma etiam frondis in icone prædictâ, casu, ut mihi videtur, truncata apparet.

Hab. Mounts-Bay, CORNWALL.

^a Quacunque furculi faxa attingunt radices agunt. Linn. Tr. v. 3. p. 160.

^b Verisimile est cavitates hæc ex tuberculis immerfis, disruptis, provenire.

^c Vid. Act. Linn. v. 3. Tab. 17. f. 2.

SHAGGY FUCUS.

PL. XI.

FUCUS. frond membranaceous, branched, spear-shaped: edges and surface garnished with branched, filiform *cilia*, or linear appendages.

PLATE.

Linn. Tr. v. 3. t. 17. 2.

ROOT small.

STEM, narrow, branched from the base, compressed, expanding upwards.

FROND, membranaceous, ribless, spear-shaped, thick set all over with simple, or branched *cilia*.

FRUCTIFICATION, imbedded tubercles? as in *F. ciliatus*.

SEEDS unknown.

OBSERVATIONS.

THIS is a very elegant species, distinct from *F. ciliatus*, as having the ligular processes, or *cilia*, as they are called, *branched*. It is, however, nearly allied to that species, which by a late arrangement includes three distinct ones

ones of GMELIN—*ciliatus*, *ligulatus*, and *holofetaceus*. It arises from a minute disk adhering firmly to the rock; and near the base, as is the case with all its affinities, it has numerous crooked shoots, which, being furnished with the same adhesive *gluten* as the disk itself, lay hold of the rocks, and serve either to add strength to the parent plant, or to produce a future progeny. The *cilia* are produced at the edges and on either surface, so as to have a bushy, fringed appearance. The stem is narrow and compressed, widening upwards, and branching into two or three spear-shaped leaves. There seems no proliferous tendency in this species, unless probably after laceration. The height of the plant is nearly five inches: its colour bright rose, or pink. On a specimen I have by me there are two or three regular imbedded cavities, resembling the ^a faucers of a *Lichen*. These I have no doubt contain the fructification, though I have not yet discovered the seeds. LIGHTFOOT says the *F. ciliatus* is eaten as *Dulse*, but I think it would require a previous preparation, as it does not possess the succulency of *F. edulis*. Since this description, together with the Drawing of the Plant have been prepared for the Public Eye, a very characteristic figure of *F. jubatus* has made its appearance in the Linnean Transactions (v. 3. p. 162.). The specimen is much more luxuriant than any I have ever met with in the S. W. Coast: its summits appear to have been torn or eaten off, which gives it a truncated, instead of its natural lanceolate form.

Hab. Mounts-Bay, Penzance, &c.

^a I suspect these to be tubercles burst.

FUCUS STELLATUS. TAB. XII.

FUCUS. fronde planâ, aveniâ, dilatâtâ; apicibus multifidis, stellatis. *With. Bot. Arr. v. 4. p. 99.*—*Raij, Syn. 44. n. 18.*—*Huds. F. ceranoides, var. δ.*—*Lightfoot. var. β.*

RADIX, plana, discoides.

CAULIS, tenuis, sensim sese expandens.

FRONS, plana, enervis, dilatata, segmentis paucis, apicibus stellatim dissectis.

FRUCTIFICATIO, eadem ac *F. lacerati*.

OBSERVATIONES.

FUCUS hic, *F. ceranoidis var. δ*, D. HUDSON; *var. β*, D. LIGHTFOOT, nuperrimè a D. WITHERING in Catalogo suo utpote species distincta, collocatur. Valdè affinis est *F. lacerati*, et nescio annon varietas ejus reputandus sit: notandum tamen obiter substantiam in utrâque specie *sub-opacam* potius quam *pellucidam* esse, et idcirco plantas in Systematis sui divisione minimè disjungendas. Radix plana, discoides, fronde in tres, quatuorve lacinas divisâ; apicibus tamen quam maximè fimbriatis, et stellatim, si ita dicam, expansis. E basi communi plures oriuntur cauliculi; uno vel altero ceteris elatiore. Color variat; plerumque olivaceus, vel brunneus, ad lucem diaphanus. Altitudo bi-vel tri-uncialis.

Hab. In litt. occident. ANGLIÆ et alibi inter lapillos.

STEL-

STELLATED FUCUS.

PL. XII.

FUCUS. frond flat, veinless, expanded : summit fringed.

(No Plate.)

ROOT, flat, circular.

STEM, flattish, small at bottom, expanding upwards.

FROND, veinless ; single, or two or three-cleft ; the summits fringed and expanded, so as to give the plant a stellated appearance.

FRUCTIFICATION, as in *F. laceratus*.

OBSERVATIONS.

THIS Species is less than *F. lacerus*, and not so much, nor so deeply lacinated. Its summit, however, is much more fringed and ruffled. It throws out several shoots from the same common disk, with one or two, generally, much larger than the rest. Its usual height is from one to three inches : its colour brownish, but when held to the light it has a purplish tinge. Messrs. GOODENOUGH and WOODWARD have classed this plant as a variety of *F. crispus* of LINNEUS (Linn. Tr. 3. p. 169.), and I am happy to find our ideas in this respect coincide. *F. crispus*, and its varieties *lacerus*, and *stellatus* still retain their affinity to each other, with this difference, that instead of being varieties of one common species, they arrange in my Synoptic Table under a new ^a genus as distinct species. Dr. WITHERING has enumerated this *Fucus* as a distinct species in his last edition of the Botanical Arrangement.

Hab. On the Shores of the West of ENGLAND and elsewhere among the Stones.

^a CHONDRUS, Syn. Tab. p. xxiv.

FUCUS PALMATUS.

TAB. XII.

FUCUS. fronde planâ, aveniâ, palmatâ. *Linn. Sp. Pl.* 1630.—*Morif. Hist. Ox.* iii. 646.—*Raij, Syn.* 46. 29.—*Huds.* 472.—*Lightfoot*, 933.—*Linn. Tr.* v. 3. 163.—*Ulva palmata*, *With. Bot. Arr.* 4. 123.

RADIX discoides.

CAULIS brevissimus, cylindrico-compressus.

FRONS enervis, glaberrima membranacea ; in junioribus plantis, coriacea in adultis.

FRUCTIFICATIO in muco pellucido, annulatim reticulato.

SEMINA minutissima, nuda.

OBSER-

OBSERVATIONES.

HABITUS prolifer nequaquam *F. proliferi* proprius est. Multi sponte, ex marginibus, vel superficie frondis; plures accepto vulnere, sobolem emittunt, et pullulant. Quo melius Tyronibus subveniatur *F. palmati*^a specimen ætate provectiore undique è margine emittentis foliola, oculis subjiciendum curavi. Nulla apud nos occurrit species vulgatio, neque est ulla, quoad scio, minus accuratè descripta. D. LIGHTFOOT icon plantam juniorem (si non forsan sit^b *Ulvæ* species) haud quidem satis feliciter exhibet; segmenta enim longiora, et quasi ligulata sunt, nec unquam ad basin ita actè stipantur, ut in Tabulâ suâ. Substantia in junioribus plantis, ut supra observavi, tenera est, et pellucida, margines integri: è contra in adultis frons coriacea fit, et margo maximè omnium prolifer; foliolis marginalibus *pedunculatis*: notandum quoque est perpauca in adultis inveniri frondis primariæ segmenta, et sæpissimè, ut in icone, folium unicum superesse amplum, coriaceum, lanceolatum. Fructificatio in adultis ferè semper cernenda est, præsertim si, abrasâ levitèr cuticulâ, frondem ad lucem oculo armato spectes. Mucus pellucidus tubulis^c annulatim dispositis interiorem frondis partim permeat, et quandoque etiam papillæ in frondis superficie lente maximè augenti conspiciuntur, præsertim plantâ recenti aliquot horas in fisco relictâ. Sectio frondis transversa tempore maturo globulos interiori cutis parti affixos ostendit; feminula in his nunquam adhuc detexi; matura tamen, frondi adhærentia, vel glomerata, vel in lineis disposita, vitro maximè augente quandoque conspicienda sunt.

Hab. passim.

^a Specimina speciei hujusce, ætatis provectioris, et fronde incrassatâ rarò palmata conspiciuntur: unica persæpè, vel faltem perpauca super sunt lacinia, incrassatæ, fructiferæ, foliis ad margines, ut in icone, numerosissimis instructæ.

^b Certior factus sum *F. palmatum* D. LIGHTFOOT re verâ *Ulvæ* speciem esse, utpote ex descriptione liquet, itemque ex speciminibus penes D. WOODWARD.

^c Fructificatio haud abfimilis *F. edulis*, vide Tab. XII. h, nat. mag. h h, auct.

PALMATED FUCUS,

PL. XII.

OR

DILLS (SCOTIS.).

FUCUS. frond flat, ribless; generally divided in deep segments.

P L A T E S.

Lightfoot, t. 27 (probably a species of *ULVA*).—*Hist. Ox. t. 8. f. 1.*

ROOT discoid.

STEM very short, cylindrical.

FROND, deeply cut in a palmated form in the younger plants.

FRUCTIFICATION, tubercles imbedded in a clear mucus disposed in annular tubes.

SEEDS hardly ever visible.

R

OBSER.

OBSERVATIONS.

A PROLIFEROUS habit, discoverable in various species of *Fuci*, has occasioned many plants to be considered as belonging to the same family, which have scarcely any resemblance in other points, and Mr. LIGHTFOOT has increased the confusion by adopting the trivial name "*prolifer*" as the distinctive character of a separate ^a species, which strictly speaking is not proliferous. Perhaps the most proliferous species in its advanced state, and at the same time one of the most beautiful, is the *F. palmatus*, the subject of this article. This species, which is common on our Coast, from inattention to it during the progressive stages of its growth, has been less accurately described than, perhaps, any other in the Catalogue. LIGHTFOOT's Plate, if his plant is not in reality an *Ulva*, is but an awkward representation of *F. palmatus* in a young state. The segments of the frond are not sufficiently *cut in*, and their shape is too much rounded in the middle; but it will serve very well to give an idea of the plant in its ^b infant state. Mr. LIGHTFOOT's description of the delicacy of the texture of the frond in this stage of growth is sufficiently correct; but whoever will attend to the progress of its growth, will find, that where it has had the good fortune to escape the numerous accidents, so tender a plant is liable to, it acquires gradually a firmness of texture, and becomes coriaceous and opaque. The proliferous habit discovers itself pretty early, and before the frond has lost its transparency, but in that case the marginal shoots are few. The beautiful fringed appearance I have delineated is in its last stage, when the frond has acquired a great degree of breadth and firmness of texture. It is remarkable, and characteristic of the plant, that all the marginal leaves are supported on footstalks, and have the same delicacy of texture as the infant plant. It should likewise be observed, that the plant, from whatever cause, is seldom found composed of many segments when old; and often, as in the Plate, of a single wide lanceolate leaf. In ^c this state a regular fructification is generally observable with a good eye-glass, when the frond is held to a strong light, particularly if the skin is carefully pared off. It consists of a curious chain-work of pellucid tubes; and, if cut transversely, there are found globules of *mucus* adhering to the inner coat, but without any visible seeds, and at times, though rarely, I have seen the surface covered with small *papillæ*, for the discharge of the seeds. The seeds may be seen with high powers, when ripe, adhering to the outer coat of the frond, either clustered, or disposed in strait lines. The Observations made by Dr. GOODENOUGH and Mr. WOODWARD on this plant evince the propriety of exhibiting it in its last stage of growth. Those Gentlemen quote *F. dulcis* of GMELIN, p. 189, from the ^d Synonyms I imagine, which the Professor has prefixed of MORISON and RAY. The representation of that *Fucus* in the Plate (GM. 26.) has no resemblance to *F. palmatus*, but a very strong one to *F. edulis*—the *Dulse* of the S.W. Coast, described in the following page; and, if it were not for its membranaceous texture, I should have little difficulty in referring it to that species. I have no doubt that SIBBALD, MORISON, and RAY made their observations on the ^e *masticatory* qualities of these Plants, and the smell of violets on an infusion with alkali, from the reports of the fishermen of those days; who in all probability made use of the fragments of each indiscriminately, as possessing similar properties, though *F. edulis* is certainly the most succulent and tender.

Hab. common.

^a The growth of *F. prolifer* is natural, and not owing to accident; or rather it is an additional mode of continuing the species. It should have been called *Catenato-prolifer*—chain-like proliferous. It is *F. rubens* of Linneus and the Linn. Tr. v. 3. p. 165.

^b I suspect this species to be *biennial* at least, and that the appearance it assumes in the annexed Plate is in the second year of its growth.

^c From internal structure and other properties, such as the violet smell, with an infusion of alkali when dry, there seems a great affinity between this species and *F. edulis*. See Ray's Syn. 46. 29. Lightfoot, p. 935.

^d GMELIN's Plant, as he says, is an inhabitant of the Sea of KAMTSCHATKA.

^e See the mode of chewing this Plant as practised by the Scotch and Irish. Lightfoot, p. 935. Gmelin, p. 190.

F U C U S EDULIS.

TAB. XII.

FUCUS. fronde simplici, cuneiformi, crassâ, enervi; apicibus rotundatis. *With. Bot. Arr.* 4. p. 101.—F. cuneiformis, HERBAR. BANKSIAN.—F. dulcis? *Gmel. p.* 164.

RADIX. Basis expansa, plures emittens caules.

CAULIS, sub-rotundus, in folium cuneiforme statim sese expandens.

FRONS simplex, variæ ætatis ac magnitudinis ex eâdem basi, cuneiformis, ampla, crassa.

*FRUCTIFICATIO—*Mucus* orbiculato-retiformis, pellucidus.

SEMINA minutissima.

O B S E R V A T I O N E S.

SPECIES hæc, adhuc inobservata, etsi in Herbariis reperta sit, in occidentali Angliæ littore vulgatissima est. Fragmenta copiosissimè, folia integra perrarò inter maris ramenta cernere est: piscibus enim, et vermibus marinis cibus omnium gratissimus, Fucus hic tranquillo maris tempore corrusus, et semefus; procelloso autem, laceratus et divulsus, reperitur. E basi communi dilatata plurimi affurgunt caules subrotundi, in folia plurima simplicia variæ magnitudinis sese expandentes. Folia majora altitudinis ferè pedalis; latitudinis fursùm sex-uncialis; substantiæ coriaceæ et enervis; coloris fusco rubri, aut si ita dicam *chocolati*. In aquâ falsâ, vel fontanâ macerata succum nobilissimi^b purpurei emittit planta hæc; nec non odorem^c violæ, sale alkali imbuta^d. Superficies folii glaberrima et nitens: maturo autem tempore tubercula minutissima glomeratim disposita, foraminulis in apice ubique erumpunt. Hisce unâ cum cuticulâ abrafis gelatina intùs pellucida per annulos vel globulos, si microscopium adhibeas, disposita est. Semina etiam minutissima, coccinea, lineis rectis transcurrentia, armato oculo ubique conspicienda sunt. Specimen F. hujus a D. Solander collectum in herbario Banksiano sub nomine *F. cuneiformis* reponitur. Notandum est iconem *F. dulcis*, Gm. t. 26. formâ frondis huic nostro proximè accedere.

* Fructificatione valdè sunt affines inter se *F. edulis* et *palmatus*; frons tamen *F. edulis* succulentior; ideoque investigationi sub microscopio accommodatior. Vid. Tab. XII. hh, Sect. frondis cum annulis maximè auctam. h, nat. mag.

^b De *Fuco* veterum, seu pigmento ex succo Fuci cujusdam in aquâ macerati, Vid. Gmel. Hist. Fuc. p. 4. In Insulis Archipelagi, ut memorat D. STELLER, occurrit Fuci species, huic nostræ forsan affinis, gustu haud minus quam colore *purpureo*, quo cibos imbuunt, inter culinæ delicias habita. Raij Hist. v. I. p. 74.

^c Vid. notulam RAIJ in Synopsi. n. 19. p. 46.

* Hæc arte condita, et exsiccata plantæ hujus frustula, commodissimè respectu saporis; et Scorbuto in Gingivâ medendo forsan saluberrimè assistantur.

EATABLE F U C U S,

PL. XII.

OR

Dulse (CORNUB.).

FUCUS. frond unbranched, wedge-shaped, succulent; rounded at top.

ROOT

ROOT flat, membranaceous, spreading; throwing up numerous leaves.

STEM roundish, short; expanding soon into a frond.

FROND simple, wedge-shaped and rounded at top; many from a common base of different sizes.

• FRUCTIFICATION internal; a chain-work of annular tubes, as the pellucid mucus appears under high magnifiers, with external invisible *papillæ*.

SEEDS very minute.

OBSERVATIONS.

It is surprising that this species, which is by no means uncommon on the S. W. Coast, should have been so inaccurately, if at all, described. Its specific character is fully sufficient to discriminate it. A reason may be alleged, which in some measure may account for its not being particularly noticed hitherto, viz. Its being very rarely cast on the shore in its perfect state. Its tender succulent texture exposes it to the danger of laceration by storms, and its nutritive qualities, to the depredation of fishes. When gathered from its native bed at the lowest ebb of an equinoctial tide, which I have frequently done, all the largest leaves, and many of the smaller ones, are found either half eaten off, or with the frond perforated in numberless places, as in the Drawing. This plant affords a no less grateful food to cattle, when accessible to them in its growing state; and the Fisherman either chews it raw, or ^b crisps it over the fire. To supply this continued consumption, it not only throws up at first ^c a plentiful crop from its wide spreading base, but is continually ^d reproducing its leaves. The most surprising quality of this plant, and one that will probably render it of service in dying I discovered by accident. Having placed some of the leaves to macerate in sea water, in order to procure seeds from it, I perceived on the second day a faint ruby tint, very different from the colour of the plant, which is a dull red, inclining to chocolate colour. Being surprised at this, I continued the maceration, and the tint grew more vivid, till it at last equalled the strongest infusion of cochineal. This liquor was mucilaginous, and had a remarkable property of being of a changeable colour; as it appeared a bright ruby, when held to the light, and a muddy saffron, when viewed in the contrary direction.^e Little need be added to the specific and detailed descriptions of this singular plant. It is sometimes found nearly a foot high, and the larger leaves about five or six inches broad at the top, which is usually rounded. Its substance is tender and succulent, of the thickness of neats leather, but never membranaceous, as in *F. palmatus*; its surface shining and polished. Under the outer coloured skin a ^f pellucid colourless jelly pervades the whole frond. In this undoubtedly is the fructification. With a favourable opportunity the seeds may be seen on the surface of the frond with

^a See *h*, a small bit cut out, with the upper cuticle pared half off: *hh*, the same highly magnified.—*N. B.* It is impossible to ascertain whether the *mucus* consists of a network of annular tubes, or of globules in contact with each other, from the defective perspective attending the use of the compound microscope.

^b See the Observation on the mode of eating it in Dr. With. Bot. Arr. 4. p. 101.

^c I have counted nearly forty leaves from a single disk.

^d It may not be amiss to hint at the surprising power of re-production from the base and stems in some species, widely differing from the prolific tendency at the edges, which many of the larger kinds of *Fuci*, such as *F. vesiculosus*, *ferratus*, &c. possess. The inhabitants of Brittany, I am informed, cut these plants *twice* in the year for manure, and the crop is always abundant. This I am assured of, from a French Clergyman of veracity.

^e This probably arose from a mixture of the substance of the frond in the liquor. I endeavoured to ascertain its dying powers by the usual methods without success, as the quantity of tinging matter was not sufficient; though, if attempted at large, and properly evaporated, it might be made sufficiently strong. However, an ingenious chemical Friend (the Rev. W. GREGOR) assures me he has procured a fine Lake from an infusion of it by means of alum.

^f See PL. XII. *h* nat. size; *hh* magnified.

with high magnifiers, either in clusters or stretched in strait lines, and crossing each other; and at this stage of the plant numerous minute tubercles with perforations at the tips may be seen as in *F. palmatus*, but this happens only when it is advancing to a state of decay, or when it has lain a few hours exposed on the sand.

Hab. Menabilly, Fowey; Acton Castle, Penzance, &c.

I have placed the *F. dulcis* of Gmelin (t. 26.) as a doubtful synonym of this species, from its remarkable wedge-shaped frond; and it seems a nearer affinity of this than of *F. palmatus*, to which it has been generally referred. Though the Synonyms of Ray, Morison, and Hudson are quoted by Gmelin, it is said to have been an inhabitant of the sea of Kamtschatka. In addition to the mastication of this and the preceding species the Lovers of *Laver* may be gratified with the account of a curious mode of dressing fish in the Islands of the Archipelago, extracted from Professor Gmelin, p. 190. "They take slices of fish, and stew them with Crow garlick (*Allium Urfinum*, Linn.) chopt small: when tender, some lard, or any animal fat, is added; and lastly, a handful or more of this *F. dulcis*, called by them *Marvei*, is put on, which not only gives a most beautiful purple tinge to the *Ragout*, but dissolves, and thickens the sauce so much, that when cold the jelly is strong enough to support a spoon, or other thing placed in it in a perpendicular direction."

F U C U S CÆSPITOSUS.

TAB. XII.

FUCUS. fronde ramosissimâ, implicatâ; apicibus clavæ-formibus.

(Species nova.)

RADIX minuta, plana, agglutinata.

CAULIS filiformis, flexuosus, ramosissimus.

RAMULI, filiformes fursùm grandiores; apicibus incrassatis.

FRUCTIFICATIO. Gelatina reticulato-tubulosa; granulis orbiculatis, feminiferis, intus; tuberculis foraminosis extus.

SEMINA minutissima, pyriformia.

O B S E R V A T I O N E S.

PARVULA hæcce, nec adhuc descripta species in rupibus Montis S^{ti}. MICHAELIS in CORNUBIA fatis copiosè provenit. A *F. pygmaeo*, cui mole suâ habituque crescendi aliquatenus est affinis, plurimum, si attentius inspicias, differt. Fructificatio enim, ut supra notavi, Generi *Fuco*, sensu restricto, propria est, et, quod mirum videatur in tam pusillâ plantâ, femina pari magnitudine ac in *F. vesiculoso* cernuntur. Seges uberrima plantularum harum etiam in præruptis scopulis frequenter cernenda est, singulis inter sese implicatis, et saxo basi propriâ agglutinatâ. Plantula quævis e cæspite sumpta statim e basi ramosa est. Ramuli filiformes, incurvi, subtus attenuati, ramulis aliis brevissimis, quibus cæspes formatur, obfiti sunt. Apices ramulorum pro ratione plantæ perampli, succulenti, nodo vel articulo juxta fructificationem instructi. In his, maturâ ætate pellucidis, et ferè cylindricis, fita est fructificatio. Granula orbicularia intus ad lucem, si microscopium adhibeas, conspicienda sunt: tubercula quoque in superficie; apicibus, ut in *F. vesiculoso*, &c. foratis; et, si portionem transversim feces, feminula minutissima in vitrum effundentur. Altitudo cæspitis, vel etiam plantæ individuae rarò semuncialis; color olivace-

us ; ad radices nigrescens, ad apices dilutè purpureus. In faxis mediis maris æstubus copertis habitat species hæc; *F. pygmæus* è contra, Licheni affinior, si non re verâ Lichen, vel Genus intermedium, ferè semper in sicco degit, nec unquam nisi summis æstubus submergitur.

Hab. MARAZION Cornub. oppid. &c.

MATTED FUCUS.

PL. XII.

FUCUS. frond very much branched, matted together in close patches : summits large, club-shaped.

(*New Species.*)

ROOT very small, flat, adhering.

STEM thread-shaped, crooked, much branched.

BRANCHES thread-shaped, smallest at bottom : summits large for the size of the plant, cylindrico-compressed.

FRUCTIFICATION. A pellucid *mucus* reticulated with capillary fibres ; with orbicular masses of seeds, within, and perforated conic tubercles on the surface.

SEEDS, minute, pear-shaped.

OBSERVATIONS.

AMONG the smaller species of *Fuci* many undoubtedly are as yet undescribed. The subject of this article is by no means uncommon on the S. W. Coast on rugged rocks, somewhat defended from the fury of the waves : it is plentiful on the Pier Stones of the Quay at St. Michael's Mount in CORNWALL. It may have been mistaken for the ^a *Pigmy Fucus* of LIGHTFOOT, or a minute variety rather of *F. corneus*, but it differs essentially from them in many respects. In fructification this Plant agrees perfectly with the Genus *Fucus*, taken in the most restrained sense of the word. The patches of it are of various sizes, and sometimes occupy large spaces of the rock. It arises from a very minute flat base : the stem and branches are round, and not exceeding the size of coarse sewing thread : it is branched from the base, and garnished near the bottom with short, crooked, rigid shoots, which serve to implicate the mass. The branches are smallest at the base, and suddenly expand at top into thickish summits, very large in proportion to the size of the plant, with an articulation generally near the top. These fructify, and become nearly cylindrical, in which state, as they are transparent, the orbicular masses of seeds are discernible, when held to the light, by a common eye-glass. On the surface likewise are to be seen conical protuberances with perforations for the discharge of the ripe seeds, as in the larger sorts, and on taking off a trans-

* The Pigmy F. of LIGHTFOOT and the *F. pumilus* of HUDSON, p. 584, may be the same ; but the specific character of the latter, mentioning axillary bladders, is in that case erroneous. It is more probable, the plants described by Lightfoot and Hudson are different species. Lightfoot's description exactly corresponds with our Plant, and I shall hope at a future day to evince that its fructification is analogous to that of *genus* Lichen. Though an inhabitant of both elements it is known to be for weeks together without being submerged.

a transverse slice, when the seeds are ripe, they will be seen to discharge themselves on the *field* of the microscope.^b The height of this diminutive Plant is about half an inch; its colour olive, inclining to blackish near the bottom; the summits light brown, with now and then a faint tinge of purple. Its place of growth is much nearer low water-mark than that of the *Pigmy Fucus*.

Hab. St. Michaels Mount, CORNWALL, and the adjacent Coast.

^a See Tab. XII. *a* A cluster of Plants. *b* A single detached specimen, nat. size. *c* A summit magnified. *d* A Papilla or Tubercle. *e* Clusters of Seeds.

F U C U S CORNEUS.

TAB. XII.

FUCUS. fronde cartilagineâ, filiformi, ramosissimâ; ramulis ad apices dilatatis, compressis, ciliatis. *Lightfoot* (Nereideus), *p.* 956.—*Huds.* (Filicinus), *p.* 586.—*Gmelin* (Sericeus?), *p.* 149.—*With. Bot. Arr. v.* 4. 117.—*Linn. Tr. v.* 3. 181. *var. β.*

RADIX, fibrillis intertexta, minutissima.

CAULIS, tenuis, subcompressus, incurvus.

RAMULI filiformes, incurvi, maturâ ætate in medio dilatati, ciliati.

FRUCTIFICATIO in^a ciliis (D. LIGHTFOOT).

OBSERVATIONES.

SPECIES hæc in occidentali Angliæ littore satis copiosè reperitur. Saxi adnascitur aliquando, frequentius autem caules Fucorum grandiorum copiâ suâ obruit. Minimè dubium est *F. sericeum* GMELINI huic nostro affinem esse, etsi plus duplo major sit; *Fucus spinosus* quoque ejusdem Auctoris a D. D. GOODENOUGH et WOODWARD, ut varietas *F. cornei* enumeratur. Habitu tamen, ut suspicor, ambæ hæ species a nostro differunt: apertissimè quidem ibi describitur plantæ nostræ habitus “fronde ad basin furculosâ, furculis radicanibus, unde frondes plurimæ confertæ oriuntur, et cava saxorum sæpe cingunt” (*Linn. Tr. v.* 3. *p.* 181.). Plantam individuum satis accuratè describit D. LIGHTFOOT, et nullus dubito quin nostra est: habitum tamen cæspititium sibi peculiarrem, omninò prætermisit. Ramuli juniores filiformes; provectiores, subtus tenues in medio dilatati, apicibus acuminatis. ^b Pinnulas setaceas, five cilia, per totam plantam, præsertim ubi frons dilatatur, cernere est. Hisce, utpote et ramulis junioribus, congeries plantularum implicatur. Altitudo plantæ individuæ bi-uncialis; color saturè coccineus. Fructificationem in pinnulis sitam esse suspicatur D. LIGHTFOOT. In tam parvulâ plantâ difficile forsan fuerit fructificandi methodum accuratè investigare. Pinnulas intumescences aliquando observavi: his transversim sub microscopio sectis, granula quædam minutissima albida in vitrum ejiciebantur.

P. S.

^a Cilia quandoque intumescunt, tuberculis intus seminulis coccineis repletis, ut mihi mandat D. Woodward.

^b “Ramuli setaceo-pinnati” nuncupantur a D. SOLANDER, notante D. LIGHTFOOT, *p.* 956, character sane distinctivus.

P. S. Varietates quatuor hujusce speciei notavêre D. D. GOODENOUGH et WOODWARD, herbariis cl. viro-
rum LINNEI, BUDDLEII, UVEDALIS, et PETIVERI accuratè inspectis.

BRISTLY-EDGED FUCUS.

PL. XII.

FUCUS. frond cartilaginous, thread-shaped, much branched: the branches widening in the middle, ciliated.

(^a No Plate of this Variety.)

ROOT, a congeries of crooked fibrous radicles.

STEM fine, rather flattish, crooked.

FROND thread-shaped; crooked, lanceolate in the summits of the branches, with setaceous spinules at the edges.

FRUCTIFICATION in setaceous pinnules (LIGHTFOOT)?^b

OBSERVATIONS.

THIS Species is by no means rare with us, as LIGHTFOOT asserts it to be in Scotland. It covers patches of rock, and likewise the lower stems of *F. digitatus*, *tamariscifolius*, and others. Its appearance is in matted tufts of thread-like shoots like many of the shrubby *Lichens*, or small *Conservæ*. This circumstance ought to have been noticed by the Author above cited. Its distinctive character seems to be an expansion of the middle of the larger shoots, which is very considerable for the size of the plant, as will appear by looking at the ^c Drawing. This enlargement is only in its ^d breadth, and not in thickness likewise, as in *F. cæspitosus*, and it sharpens to a point, so as to resemble a spear-shaped leaf. The root is singularly matted as above described, and is the cause of its adhesion to its place of growth with an unusual firmness. A single plant detached from the mass is generally about two inches high, branched nearly from the bottom, and smallest downwards. It is rather cartilaginous in its texture, and of a glossy surface, from whence probably GMELIN has called an affinity of this species *Silky Fucus*. The whole plant is beset with short bristly pinnules; those on each side of the wide part of the frond are sometimes swollen at the tips. In these LIGHTFOOT conjectures the fructification is situated, and Mr. WOODWARD informs me he has discovered tubercles of seeds in some of them. On cutting some of these tips transversely under the microscope, a clear mucus with very minute granules was poured out on the *field*. These seem to be the seeds, but were probably in an immature state.

Hab. Acton Castle, Marazion, &c. &c.

FUCUS

^a Gmelin's t. xv. f. 3. has all the habit of this species, but is three times as large; his t. xviii. f. 3. is likewise an affinity with the segments still wider, and said to be British. I have some specimens very nearly as large. It is remarkable that Gmel. mentions a proliferous var. of this last (p. 161.) with *setæ* covering the two *surfaces*, as well as the edges, which shews an affinity between this species and *Fubatus*.

^b Mr. Woodward likewise has observed these *cilia* in some instances swollen and appearing to contain a tubercle of deep red seeds. This Plant in the Linn. Tr. is said to have a minute disk, which I have not observed.

^c See PL. XII. f, a cluster of Plants, nat. size. g, a single specimen.

^d This is not always the case: See the preceding account of it when fruiting, (note ^a p. 61.) though it is always compressed.

F U C U S CRISPUS.

TAB. XII.

FUCUS. fronde angustâ, cartilagineâ, dichotomâ ; apicibus furcatis ; pericarpis immerfis.

Linn. S. Nat. 812.—*F. ceranoides*, *Lightfoot*, 913.—*Huds.* 582.—*Raij*, *Syn.* 44. n. 16.—

Linn. Tr. v. 3. p. 169. *var.* β .—*F. membranifolius*, *With. Bot. Arr. v. 4. p.* 106.

RADIX, discoides, plures emittens cauliculos.

CAULIS, complanatus, dichotomus, fursum dilatatus.

RAMULI dichotomi, plani, fursum levitèr dilatati ; segmentis ad apices numerosissimis, divaricatis.

FRUCTIFICATIO : tubercula, seu pericarpia, ovata, folitaria, rigida, innata, utrinque prominentia.

SEMINA intus in muco pellucido.

O B S E R V A T I O N E S.

Vix ulla species vulgatiores est apud nos. A R A T O quidem in *Synopsi* p. 44. n. 16. in sectione plantas “folio plano, pellucido” continenti planta hæc, sed haud satis definitè, describitur. Vocabula quidem “*F. ceranoides*, variè dissectus” errores et hallucinationes, ut ^a alibi observavi, satis conspicuas inducere, nec ullibi, nisi in Florâ Scoticâ accuratus hujusce plantæ extat character specificus. E basi communi dilatatâ, irregulari, plurimi oriuntur cauliculi ^b angusti, complanati, leviter fursum dilatati ; primum simplices et erecti, deinde per dichotomiam sese expandentes : intervallis dichotomiæ fursum brevioribus. Summitates frondium ramosissimæ, et flabelli ad instar expansæ, apicibus quoque furcatis. Substantia folii cartilaginea, et diaphana ; altitudo triuncialis, et suprâ : cauliculi usque ad quadraginta ex eadem basi : color variat multum. Fructificatio juxta apices sita est. Tubercula duriuscula, ovata, purpureo-rubra, frondi innascuntur. Intus semina in muco cernere est, si adhibeatur cullus ; maturo autem tempore rupto tegmine in frondem ejiciuntur, ibique firmiter satis adhærent.

P. S. Nullibi clariùs emicuere labores D. D. GOODENOUGH et WOODWARD quam in hac specie e tenebris Synonymorum eruendâ.

Hab. passim.

(V A R. β .)

TAB. XII.

..... foliolis fructiferis complanatis, bifidis ; pericarpio immerfo.

SUBSTANTIA plantæ hujusce, cujus summitatem fructificantem solummodò delineavi, æquè ac prioris cartilaginea est ; fructificatio eadem : frondis tamen habitus variat laciniis ad apices dilatatis, truncatis, ligulisque, seu foliolis fructiferis è margine superficieque erumpentibus. Proximè *F. ceranoidis* var. ϵ et ζ in Catalogo D. LIGHTFOOT locum suum obtinebit planta hæc. Suspicio quidem verrucosas illas in FL. SCOTICA varietates minimè a nostrâ disjungendas ; ligulæ enim suprâ memoratæ, primò convolutæ verrucarum ad instar dein sese evolvunt. Notatu dignum est quoque corpuscula hæc *verruciformia* a D. LIGHTFOOT (p. 917.) “ligamenta” vocari, maculasque

T

quasdam

^a Vid. p. 50, 51.

^b “Octavam uncie partem lati” (D. Lightfoot, p. 914.) ; notandum est plurimum inesse similitudinis inter habitum *F. fastigiati*, et *F. crispi*.

quasdam rubras ab illo intus inveniri feminulis repletas, pericarpium forsan rudimenta. Ut ut se res habet, fructificatio plantæ nostræ (Tab. XII. *k, kk.*) *solitaria, immersa, et utrinque prominens* affinitatem in Tabulâ Synopticâ (p. xxiv.) stabilitam, quæ in frondibus verrucosis, ut vocantur, ligamentis proliferis convolutis, vel succulentis minus perspicua est, satis apertè denotat. Altitudo plantæ sexuncialis: color fuscus, vel brunneus in adultis; in junioribus, præsertim in foliolis fructificantibus, amœnè purpureus.

Hab. juxta PENSANCE in CORNUBIA.

CARTILAGINOUS FUCUS,

PL. XII.

OR

Buckshorn.

FUCUS. frond narrow, cartilaginous, dichotomous: summits much branched, divaricated; with solitary, innate pericarps.

P L A T E S.

Gmelin. t. 7. f. 3. (a single branch, large).

ROOT thin, spreading, throwing up numerous shoots.

STEM flattish, gristly, dichotomous near the top, and gently dilated.

BRANCHES dichotomous, shortening upwards and slightly dilated; spread out like a fan.

• **FRUCTIFICATION** solitary, imbedded, oval tubercles, of a horny texture, and a bright red colour; prominent on either surface.

SEEDS numerous, blood-red, in a clear mucus.

OBSERVATIONS.

THE Species here delineated is *F. crispus* var. β of the Linnean Transactions, not the var. α , which, I understand, has a wider, and rather palmated frond like *F. ceranoides* of GMELIN^b, t. 7. f. 1. I entertain no doubt, however, but it is the true *F. ceranoides* of LIGHTFOOT and HUDSON, as it is one of the most common plants of our Coast. LIGHTFOOT'S Description, which I subjoin in a note,^c is extremely characteristic; he there says the breadth of the leaves is generally one-eighth of an inch. When thrown on the shore after a storm it is frequently found in large masses, with from forty to a hundred shoots from a common disk. In this state it resembles very much the habit of *F. fastigiatus*, the *short forked Fucus*, as they both throw up numerous shoots from a common disk, and both have their summits crowded, owing to the dichotomous segments being numerous and short

^a PL. XII. *ii* a fructified summit magnified. *k* the imbedded pericarp.

^b I doubt the accuracy of Professor GMELIN in his delineation of *F. ceranoides*, t. 7. f. 1. (not to mention his classing it in his first Order of *F. vesiculofus*). I much doubt whether the round bodies on the frond may not represent incipient *mamillæ*, or leaflets rolled up. They certainly give no idea of imbedded pericarps.

^c "Many radical leaves arise from the same root or base, and spread upon the rocks in a circular form, or (as the water often leaves them) in

short in each towards the summits. The height of this plant is about four inches, the breadth of the leaves about an eighth of an inch at top, narrower downwards. Colour very variable. The cartilaginous pellucid texture of the frond, and its solitary imbedded pericarps serve under all its varying forms to discriminate this species. I have been much gratified with the very accurate Observations of the Gentlemen so often alluded to respecting this species. I find they coincide with me in opinion as to the confusion introduced by mistaken synonyms. In consequence of comparing the specimens in the different *Herbaria*, they have placed the palmated, or broad leaved variety of GMELIN, t. 7. f. 1. at the head of the species. I think, however, from the frequency of the specimens cast on our shores that the plant I have delineated is the sort described by ^d LIGHTFOOT and HUDSON. When it grows in that wide-expanded form, it is difficult to distinguish it, unless in fructification, from the *mamillose* and *echinated* species in a state of adolescence.

(V A R. β .)

PL. XII.

..... leaflets, membranaceous, bifid, with an imbedded seed-bearing pericarp.

I INTRODUCE this Plant as a variety of *F. crispus*, from similarity in the essential point of fructification, and in compliance with our older Writers. The sportive habit of the species *Crispus*, the *F. ceranoides* of RAY, HUDSON, and LIGHTFOOT, has been long since noticed by them, and in a particular manner by Professor GMELIN (p. 116.). This Plant, a summit of which I have delineated, will afford an agreeable illustration of this habit; for if reference were had to fructification alone, it would be difficult to conceive that a *wart-like excrescence* on the surface, or at the edge of a frond, or a *projecting succulent ligament* as LIGHTFOOT calls it, could have any analogy with an *oval imbedded pericarp*, which is the character of *F. crispus* in the Linn. Tr. v. 3. 170. This var. of *F. crispus*, or, what I think more proper, this species of *Genus*, CHONDRUS, exhibits a singular mode of fructification, viz. at the edges and on the surface near the edges are produced leaflets of the same texture with the parent frond, only proportionably thinner and more transparent. These leaflets are bifid at top, and in these are found imbedded the proper pericarp, *oval, immersed, and prominent on either side*. On considering the Descriptions of RAY, &c. and the general affinity of their warty varieties, it is not unfair to conclude that the “wart-like excrescences and proliferous ligaments” described by them may be only the leaflets rolled up, as they appear in an immature state. It is hoped that this matter will attract the notice of those who are in daily habits of examining these plants in all stages of their growth. This *Fucus* is tall, with narrow segments.

the form of an arc of a circle. Each leaf is most commonly about four inches long, and one-eighth of an inch wide, but varies from one to seven inches in length, and from one-twelfth to an inch in breadth; of a tough cartilaginous substance, horny when dry, pellucid when held between the eye and the light; often of a bright purple colour, sometimes of a green colour, most usually a purple intermixed with green, and frequently, when cast upon the shores, and exposed to the sun and air, of a yellowish-white or horn-colour. Again, each leaf is plane or flat on both surfaces, entire on the edges, of an uniform texture, without rib, simple, undivided, and narrowest at the base, wider and dichotomous upwards, but divided into so many segments towards the extremity, that, taken collectively, they resemble a *Corymbus*. Each segment is bifid at the summit; the two lobes generally short and obtuse, but often longer and more acute. The fructifications appear in the summits of the segments, imbedded singly, one for the most part near the apex of each lobe, resembling a minute red wart or vesicle, of the size of the smallest pin’s head, and full of numerous seeds. Sometimes these fructifications are seen lower in the substance of the leaf.” Fl. Scot. p. 914.

^d Lightfoot makes Gmel. tab. 7. f. 3. the principal, and f. 1, 2. the varieties.

F U C U S ECHINATUS. TAB. XII.

FUCUS. fronde cartilagineâ, divaricatâ, profundè incisâ; superficie ex unâ parte spinulis obtusis oblitâ. (Spe-

(Species nova.)

RADIX tenuis, plana, agglutinata.

CAULIS dichotomus, compressus.

FRONS cartilaginea, expansa, enervis; laciniis profundè incisis, spinulis ex unâ frondis paginâ.

FRUCTIFICATIO in spinulis, interna.

SEMINA minutissima in muco pellucido.

O B S E R V A T I O N E S.

FRONS Speciei hujus ex unâ parte solummodò echinata differt aliquatenùs a *F. mamilloso* D. D. GOOD-ENOUGH et WOODWARD. Folia antiquitùs^a “verrucosa” audiere, unde et nomen Anglicum; minus accuratè tamen; spinulis enim quam verrucis similia sunt, quæ è superficie erumpunt, corpora cylindrica, et incurva. Planta tota re verâ echinata est, ut ex icone apparet: basi nititur exili, complanata. Caulis tenuis, dichotomus, sensim sese expandit. Folia expansa, profundè incisa, et quasi palmata, è caule producuntur, quorum divaricatio tanta est, ut “circuli curvaturam,” ut ait D. LIGHTFOOT, efficiunt; necnon planta tota, utpote plurimis hisce foliis instructa, quam maximè “corymbosa” apparet. E basi communi plures oriuntur cauliculi variæ ætatis.^b Fructificatio in spinulis maturo tempore etiam sine vitro conspicienda est. Altitudo plantæ triuncialis, latitudo sæpe dimidio major: substantia frondis rigida, cartilaginea, ad lucem diaphana: color amœnè viridis, aliquando olivaceus aut fusco-purpureus, et haud rarò in adultis, interstinctus maculis, fusci, viridis, et purpurei. Spinulæ rufæ aut brunneæ nonnisi ætate maturâ proveniunt, unde D. MORISON rectissimè dicit “foliis ut plurimum verrucosis.” Frondis sc. pagina in adolescentibus, vel sterilibus, lævis, aut saltem verrucis minimis, foliolis forsan convolutis, punctata cernitur, unde GMELINI tab. VII. f. 1. intuenti scrupulus mihi injicitur, annon species illa etiam huc referenda sit.

^a Vid. Mor. Hist. Ox. 646.—Raij Syn. 44. n. 16. Spinulæ hæ, aut si mavis secundum D. Lightfoot, “Ligamenta prolifera” (91), immaturâ ætate, rotundiusculæ sunt et convolutæ.

^b Vide quæ observavi respectu fructificationis in succulentis hisce ligamentis, itemque affinitatis inter speciem hanc et *Fucum crispum*, var. β. p. 65.

ECHINATED FUCUS.

PL. XII.

FUCUS. frond cartilaginous, widely spreading, with deep segments: the *upper surface* covered over with blunted succulent spines.

(No Plate.)

ROOT small, thin, adhering.

STEM, compressed, dichotomous.

FROND

FROND, gristly, suddenly expanding, ribless, transparent; cut into deep segments, echinated on one side.

^a FRUCTIFICATION in the summits of the spines, consisting of numerous dark coloured and very minute seeds imbedded in a pellucid jelly.

OBSERVATIONS.

THIS Species is probably new, as having the spinous protuberances on one side only. These are generally somewhat crooked, succulent, and transparent, and are designed as the organs of fructification. In their summits are lodged the seeds, which, when ripe, may be seen with a strong eye-glass, if held to the light. These spines, or “proliferous ligaments,” as LIGHTFOOT calls them, usually come out, as I before observed, from one surface only, and there are the appearances of cavities on the opposite side, as if they were hollow, and had a communication upwards. The general height of this plant is from three to four inches: its stem is narrow, and compressed, widening upwards, and dichotomous. Its divarication is so considerable, that its breadth is frequently double its height. The summits suddenly expand, and have very deep incisions, so as to appear irregularly palmated: the tips of the segments are bifid and forked. Colour bright green, sometimes olive: spines brown. It must be observed that this species when young, as likewise the other warted kinds, has no appearance of spines, which corroborates the idea of their being an appendage of fructification, and this is rightly hinted by ^b MORRISON. I took it for granted on a first view, that this species would prove to be the *F. mamillofus* of the new Catalogue (Linn. Tr. v. 3. p. 174.); but on a careful examination of the specific character of each, I shall venture to keep it distinct under the trivial name adopted above. The stem is rolled somewhat in at the edges, making a furrow in the middle, so as to answer the character of “*hinc canaliculatus*.” ^c Its bright apple green colour is remarkable in a sea plant, and characteristic of the species.

Hab. Marazion, Acton Castle, &c. &c.

^a PL. XII. *m* one of the papillæ magnified. *n* the seeds.

^b Mor. Hist. Ox. 646.

^c Linn. Tr. v. 3. p. 104.

FUCUS SEDOIDES.

TAB. XII.

FUCUS. frondē tereti, gelatinosâ, diaphanâ, tenerâ; ramis paucis: foliis crassis, utrinque attenuatis, petiolatis. *Reaumur. Act. Gall.* 1712. p. 40.—*Lightfoot.* (Vermicularis) p. 958?—*Linn. Tr. v.* 4. p. 117.

RADIX discoides, plana, agglutinata.

CAULIS cylindricus, tener, diaphanus.

RAMULI pauci, sub-dichotomi, teretes.

FOLIA succulenta, diaphana, petiolata, ramulos undique circumdantia.

FRUCTIFICATIO, gelatina, pellucida, retiformis, foliis immersa.

SEMINA minutissima, glomerata, coccinea.

OBSERVATIONES.

SPECIES duæ substantiâ et habitu paululûm inter se discrepantes in littoribus nostris reperiuntur *F. F. ovalis* et *sedoides*. Ambas hæc sub communi *F. ovalis* nomine includit D. HUDSON, synonymis *F. vermicularis* et ^a *polypodioidis* D. GMELIN in unum relatis. Habitus *F. ovalis* procumbens, divaricatus, rigidiusculus, foliis sparsis, apice *obtusis*: *F. sedoidis*, erectus, *mollis* (Reaum. Aët. Gall. 1718, p. 40.), foliis undique glomeratis, apice *attenuatis*. E basi tenui discoidi caulis unus et alter affurgit subnudus, erectus. Ramuli pauci, ad basin foliis viduati. Folia hæc vix tertiam unciae partem longa, formâ et substantiâ, ut ait D. LIGHTFOOT (p. 958.), “foliis *Sedi albi* quam fimillima sunt.” ^b Color amœnè rosaceus. Fructificatio in foliolis juxta apicem reperitur. In interiori substantiâ ad lucem oculo armato cernuntur semina, queis per foramina minutissima maturo tempore datur exitus in mare. Notandum est, cum sit planta omnium tenerrima, habitum in speciminibus ficcis magnoperè variare, foliis inter ficcandum, aut deciduis, aut compressis, et quasi membranaceis. Species est ferè semper parasitica.

Hab. Acton Castle, Pensance, et alibi.

^a *F. polypodioidem* in Catalogo suo omisit D. Lightfoot, qui descriptionem apud D. Gmelin “foliis oblongis, obtusis, integerrimis . . . nervo in illis nullo, &c.” p. 186, a specimine exsiccatum sumptam, minus accuratè perspexit. *F. dasypphyllus* nov. sp. (Linn. Tr. v. 3. p. 119.) hujus speciei affinis est.

^b Character distinctivus, quoad hætenus observavi, inter hæc species a colore sumendus est. *F. ovalis* in CORNUBIA semper olivaceus, vel candidans (Gmel. p. 162.) reperitur; *F. sedoides*, ruber.

^c Vid. Lightfoot, 958.

STONE-CROP FUCUS.

PL. XII.

FUCUS. frond cylindrical, tender, transparent: branches few; leaves succulent, swelling in the middle, furrounding the branches.

P L A T E.

Aët. Gall. 1712. t. 4. f. 8.

ROOT, discoid, flat, adhering.

STEM, round, of the size of large packthread, gelatinous, transparent.

BRANCHES, few, erect, of an equal size throughout.

LEAVES furrounding the branches, succulent, smallest at each end, pedunculated.

^a FRUCTIFICATION, a net-work of capillary tubes immersed in the substance of the leaves.

SEEDS very small, blood-red.

OBSER-

^a PL. XII. l. l. a fructifying leaf magnified.

OBSERVATIONS.

THIS Species I have called *F. fedoides*, as differing in many respects from the *F. vermicularis* of LIGHTFOOT and GMELIN, which is the *F. ovalis* of HUDSON. It is always, I imagine, a parasitical plant, and commonly to be found growing on the large footstalks of *F. digitatus*. It sends up one, and sometimes two or three stems, which are divided at top into a few principal branches; not, however, strictly ^b dichotomous; the stem and lower part of the branches are naked: at the top the latter are garnished all round without any order, with tender succulent leaves growing on slender footstalks. These leaves swell in the middle, and are more pointed at the tops than *F. ovalis*: they are transparent, and of a smooth shining surface. The usual height of the Plant is from two to four inches; the length of the leaves, which are all of a size, about three-tenths of an inch. The succulency of these leaves, and the manner of their surrounding the upper parts of the branches gave LIGHTFOOT the idea of the *Sedum album*, or common white flowering Stone-crop. The whole Plant is of a bright clear pink colour. The fructification is situated in the upper leaves, and may be seen, if held up to the light, by a common eye-glass. It consists of minute red globules, which on dissection appear to be imbedded in a colourless reticulated jelly, in the same manner as *F. articulatus*, *pinnatifidus*, *kaliformis*, &c. On highly magnifying a piece of the leaf, I discovered the surface in an advanced state perforated with minute holes for the discharge of the seeds. I find, on inspecting Dr. GOODENOUGH and Mr. WOODWARD's Catalogues, that this species is separated from *F. ovalis*, and by a happy coincidence under the self-same trivial name which I have adopted.

^a This character is ascribed to *F. vermicularis* by Lightfoot, p. 959, though Gmelin's Pl. 18. f. 4, which he commends, is far from dichotomous. There is certainly a great affinity, but the shape of the leaves, the firm texture, and straggling growth of *F. ovalis*, and its globular fructification (Linn. Tr. p. 1. p. 117.) are sufficient to keep it distinct; as likewise the colour, which in *F. ovalis*, as far as I have observed, is brown or olive, in *F. fedoides* bright red.

FUCUS THRIX.

TAB. XII.

FUCUS. fronde, simplici, fetaceâ, tubulosâ; plurimis è basi communi. *With. Arr. v. 4.*
p. 116.

(*Species nova*).

RADIX plana, tenuis, agglutinata.

FRONS, fetacea ad basin attenuata in medio turgidula: futurâ spirali.

FRUCTIFICATIO interna, filamentis implicatis, diaphanis constans.

SEMINA minutissima, opaca.

OBSERVATIONES.

IN fissuris rupium juxta ACTON CASTLE in finu ^a MOUNTS BAY dicto occurrit parvula hæc species. Habitu frondis cylindrico, tubuloso, nec non futurâ spirali *F. filum* refert, distinctissima tamen est; nunquam enim, quoad observavi,

^a In Comitatu CORNUBIÆ.

observavi, solitaria reperitur. E basi communi oriuntur bina, terna, fena, aut etiam plura fila cylindrica, tubulosa, variæ ætatis et magnitudinis: juniora, planè fetacea; provectiora, in medio et ad apices turgidula, intus filamentis capillaribus, tubulifve pellucidis lanæ ad instar inter se implicatis, repleta. Altitudo plantæ biuncialis, vel etiam sexuncialis; color olivaceus; cuticula glaberrima, lubricissima, nitens. Fronde maturescente, apices marcescunt, et substantiâ, ut nudis oculis apparet, lanosâ operiuntur: si microscopium adhibeas, filamenta capillaria supradicta cernuntur, sensim sese evolventia. Filamenta hæcce septis ad intervalla instructa, granula intus opaca minutissima continent, quæ, vel semina, vel saltëm, feminum sunt rudimenta.

Hab. Acton Castle, Penfance, *et alibi in occident. Angliæ littore.*

CAPILLARY FUCUS.

PL. XII.

FUCUS. frond thread-shaped, unbranched, hair-like: many threads from the same base.

(No Plate.)

ROOT flat, thin, spreading.

THREADS, hair-like, small at bottom, swelling a little in the middle, and at the tips, with a spiral seam.

* FRUCTIFICATION. A collection of woolly fibres, which on being highly magnified appear to be transparent capillary tubes with *septa*, or partitions.

SEEDS, very minute dark-coloured granules in the tubes.

OBSERVATIONS.

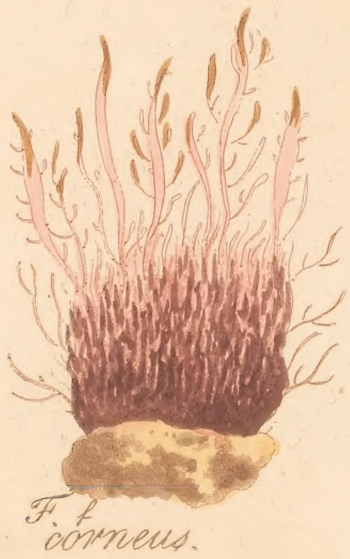
THIS minute plant has hitherto escaped Botanical notice. Indeed unless you stoop low it is not to be discerned, as it grows in the clefts of the rock. Its usual height is from two to four inches, some few threads occasionally attaining the length of six inches. Its base or disk is flat and creeping on the rocks: it sends up from two, to ten thread-like unbranched shoots: the younger ones of an uniform slenderness; the elder ones very small near the base, and gently swelling in the middle and at the tips. These latter discover on being held to the light a spiral seam. Clusters of these minute plants are sometimes found spread, as it were in patches. Its firm elastic slippery coat, and gelatinous interior part, added to the spiral mode of its growth, might induce a belief that it was only a variety or infant plant of *F. filum*, but its clustered habit is alone sufficient to discriminate it. The summits are frequently found decaying, and at that time they appear to be covered with woolly filaments: but on examining and dissecting them, they appear to be pellucid^b capillary vessels continued through the frond, and evolving themselves in the water. ^c These vessels when more highly magnified appear to be tubes furnished with *septa* or partitions, and not unfrequently when far advanced you discover very minute dark-coloured granules, which must be either the seeds, or the rudiments of seeds.

Hab. ACTON CASTLE, Mounts-Bay, CORNWALL.

^a PL. XII. o, o, o Summits evolving. p a Summit highly magnified. q, q, q The tubes.

^b See PL. XII. q, q.

^c I have arranged this minute Plant under *genus* CHORDA in the Synoptic Table, but our knowledge is too confined as yet to fix the boundaries between many of the marine plants that are so nearly allied in habit. The tubular *Ulvæ* of Mr. Woodward (Linn. Tr. v. 3. p. 52.) will probably hereafter form a distinct *Genus*.



F U C U S CERANOIDES.

FUCUS. fronde planâ, integerrimâ, æquali, dichotomâ; nervo intermedio; fructibus oblongis, acuminatis. *Herb. Linn. Buddle. p. 6. n. 3.*

RADIX, discus, explanatus, plures emittens furculos.

CAULIS compressus, solidus; membranâ laterali versus basim laceratâ, vel abrasâ.

RAMULI dichotomi, punctulis, five porulis aspersi, nervo intermedio: apicibus in foliis junioribus, furcatis; in maturis, fructificatione mucronatâ terminatis.

FRUCTIFICATIO in apicibus ramulorum lateralium; plures simul vesiculæ, oblongæ, mucosæ, acuminatæ.

O B S E R V A T I O N E S.

AUCTORITATE cl. virorum D. D. GOODENOUGH et WOODWARD, inspectoque a me nuperrimè Herbario Linneano, speciem hanc fisco, texturâ frondis tenuiore, fructûsque formâ a *F. spirali* planè diversam. Auctorum discrepantiam respectu nominis trivialis in Fasciculo posteriore memoravi.^a Habitus Plantæ ex icone liquet; variat aliquando latitudine foliorum. Fructificatio non nisi in apicibus hiennibus conficitur. Fructificationis methodus, prout Microscopio subjecta conspicitur, *F. vesiculosi* supra memorati affinis. Gmelini *F. filiformem*, icone inspectâ, haud ausim, pro Synonymo admittere. In Herbario Linneano, extat specimen *F. filiformis* Iconi Gmelini simile, et a *F. ceranoide* planè diversum. *F. filiformem* statu recenti nunquam adhuc vidi, neque in Herbariis anglicis a me inspectis exemplar ejus exsiccatum vidi.^b

Hab. Ch. Church, in Agr. Hants.

^a Vid. p. 50. 51. 63. Minimè dubium est Linneum Speciem suam pro *F. ceranoidi* Raij accepisse, ut ex Synonymis constat; mirum tamen videtur D. Lightfoot, Ch. Spec. viz. "Fructificationem bifidam tuberculatam" a Linneo *F. ceranoidi* attributam minime *F. ceranoidi* Raij convenire sensisse, utpote etiam ex loco in Catalogo Linn. proxime *F. vesiculoso* conjicere par erat.

^b In herbariis majoris notæ Fuci vulgares vix obtinent locum vel saltem unum alterumve conspicitur specimen. In Herb. tamen D. Velley *F. vesiculosi* formis variis, quibus illudit, copia mira cernenda est, sed nec ibi *F. filiformis* Gmel. *F. linearis* Hudf. *F. distichi* Lightf. apparet exemplar.

F U C U S CERANOIDES.

FUCUS. frond flat, very entire, of an uniform breadth, dichotomous, midribbed, with oblong acuminate Fructifications.

(No Plate.)

ROOT an expanded Disc sending up numerous shoots.

STEM compressed, solid, with the *alæ* of the midrib either ragged or quite worn off, below.

BRANCHES dichotomous; each surface punctured over with small apertures: the summits in the younger shoots forked, in the elder terminated with oblong acute Fructifications.

FRUCTIFICATION generally lateral, consisting of clusters of sharp-pointed vesicles.

OBSERVATIONS.

THE arrival of the Herbarium of Linneus in this Country has clearly ascertained the Species called by him, at least in his later publications, by the trivial name of *F. ceranoides*; and though with reluctance at transferring a name long rendered familiar to my ears from a well known to a more rare species, and being likewise confident that the transfer originated in error,^a yet to prevent further confusion between ourselves and foreign Botanists, I follow the example of the learned Authors who have so ably described the British *Fuci*.^b

Many doubts are entertained by respectable Botanists about the propriety of separating the coriaceous midribbed *Fuci*. Gmelin comprises them all under the common trivial name of *F. vesiculosus*. Lightfoot has made four different species, and Messrs. Goodenough and Woodward have reduced them to three. I am convinced however from actual observation, that there are many kindred species still undescribed, which, being propagated from seeds, continue unchanged, and occupy extensive portions of the Sea Coast, in the same manner as it is observed of some Land Plants, which though nearly allied in habit, never, or rarely intermix, and produce hybrid plants. This fact must wait till more accurate investigation under the microscope shall furnish proper *data* to decide on. I add a new species in the article immediately subsequent to this—a native of the S. W. Coast.

The Species just described is always nearly of an equal breadth throughout, but that breadth varies from half an inch to nearly that of a straw. Its habit of growth, however, which at top is divaricating and Antler-like, is very different from the *F. filiformis* of Gmelin, if one may judge from his Pl. Tab. 1. A. This however has been referred to as a Synonym by Lightfoot and Hudson, and recently in the Linn. Tr. Unfortunately no specimens of the two former Authors are extant, from whence they have taken their descriptions, and the specimens furnished me by Mr. Woodward, from one of which the Drawing is taken, do not at all resemble Gmelin's Plate, or the Linnean Specimen.

Hab. Christ Church, Hants.

^a Linneus quotes the Synonym of Ray. See my Observ. p. 50. 51. 63.

^b Linn. Tr. v. 3.

FUCUS SHERARDI.

FUCUS. fronde dichotomâ, coriaceâ, punctatâ, costatâ; foliis brevioribus ad apicem congestis; fructificatione in summis foliorum, formâ immutatis. *Herb. Sherardi. Ox. N. 1.*

RADIX, callus expansus.

RAMULI dichotomi, infernè, planè nudi.

FOLIA in capitulum collecta; apicibus obtusis, vel furcatis; margine undulato.

FRUCTIFICATIO. Granula intus seminifera, papillis extus perforatis, ut in ^a *F. vesiculoso*; sparsim tamen, vel in orbem collecta, minimè in fructum intumescencia.

OBSERVATIONES.

DIGNISSIMUS Vir, D. WILLIAMS, qui Cathedram Botanices apud Oxonienses occupat, specimen *Fuci* hujus SHERARDI manu subscriptum nuperrimè mihi ostendit. Titulus “*F. seu Quercus marina latifolia, humilis, sine* “*vesiculis.*” Apud Raium in Syn. p. 41. Species, cui præfigitur Titulus hic, ut var. *F. vesiculosi* distinguitur in

^a Vid. Proëm. P. XIX. itemque T. 9. ABC.

notulâ editoris subjunctâ, his verbis, “ Ineffabilis fane est in hoc genere varietas ratione ætatis et loci, aliorum-que accidentium ” MORISONUM adiens Species tres humiles, seu altitudinis palmaris, invenio P. 647. n. 10, 11, 12. quorum mediam in CORNUBIA repertam *F. canaliculatum* capitulis ante fructificationem intumescens, ut sæpius vidi, designare judico. Icon etiam posterioris, t. 8. n. 12. *F. canaliculatum* maturum satis accuratè exhibet; prior vero t. 8. n. 10. qui omnium consensu *F. spiralis* refertur, minus feliciter speciem aliquam adhuc a me repertam adumbrat. Apices minimè intumescens, sed, ut in *F. ferrato*, compressi exhibentur. Notum tamen omnibus est *F. spiralis* fructûs contractione frondis ab apice quasi separari, binosque in singulis apicibus, ternosve (ut ait rectè MORISONUS,) ibi efformari. Omittis ergo ambobus. Speciem hanc, cum SHERARDI specimine ex omni parte congruentem et ex CORNUBIA statu recenti, ut in Icone exhibetur, transmissam, sub nomine Botanici illius celeberrimi ævi posterioris, sisto.

Charaeter specificus, necnon partium descriptio, ut supra, unâ cum iconè magnitudinis naturalis satis accuratè Speciem hanc ab affinibus ejus, ut spero, discriminabit. Species plures coriaceas sub nomine *F. vesiculosi* adhuc latere mihi persuasissimum est.

Hab. Pridmouth Bay, juxta Fowey in Cornubiâ.

V A R. α.

SPECIMINA fronde angustâ linearî, una cum specie mox descriptâ ex Cornubiâ missa sunt. Altitudo et ramificatio fimiles. Iconem omitto: specimen tamen in Tab. XIII, figurâ 2, notatum libet delineare: annon species distincta sit, vel junior Planta, nescio; quanquam nebulas in furcis, granulorum, ut suspicor, rudimenta, observavi. Ex descriptione D. LIGHTFOOT, hîc potius referendus est *F. distichus* Fl. Scot. quam *F. ceranoidi*.

Hab. juxta FOWEY in CORNUBIA.

F U C U S SHERARDI.

FUCUS. frond dichotomous, leathery, punctured, midribbed; leaves shortish, crowded at top; fructification in the summits of the leaves, not swelling into distinct fruit vessels.

(No Plate.)

ROOT an expanded disc.

BRANCHES dichotomous, quite naked below.

LEAVES forming tufts at top; either obtuse or forked; edges undulated.

FRUCTIFICATION analogous to that of *F. vesiculosus*; but not forming a separate Fruit.

OBSERVATIONS.

HAVING long suspected the existence of a Species differing essentially from *F. spiralis*, though hitherto confounded with it, I inspected with this view the *Herbaria* of SHERARD and BOBART at the Physic Garden, Oxford, having experienced the greatest attention in this research from the present learned Professor of Botany, Dr. WILLIAMS. I accordingly met with one exactly agreeing with a specimen from Cornwall, which is represented in the annexed Plate. Its Title in the hand-writing of Mr. Sherard is “ *F. seu Quercus marina latifolia, humilis sine vesiculis.* ” Ray has introduced this as one of the varieties of *Alga latifolia vulg.* the *F. vesiculosus* of later writers, taking no notice of air-bladders as a specific character. The varieties of this *Fucus*, his Edi-

tor in a note says (Syn. p. 41.) are not to be enumerated.^a MORISON omits this Synonym, but enumerates 3 species, *humiles*, or *palmares*, of humble growth, (Hist. Ox. p. 647. No. 10, 11, 12.). The first, though referred to by Lightfoot and Messrs. Goodenough and Woodward, as *F. spiralis*, seems to be different from it in the drawing,^b t. 8. f. 10. and much more so in the description; as *F. spiralis* is certainly more than a "hand's breadth in height." I should imagine it was intended to describe a near affinity of the two following, No. 11, 12, which in my opinion are only different states of *F. canaliculatus*; No. 11. inflated at the tips previous to fructification, No. 12—in fruit. My opinion of the impropriety of confounding so many Plants essentially differing in habit and fructification under one common species is hinted in the preceding article, and was before under *F. vesiculofus*, p. 3. 12. A more accurate investigation under the microscope will furnish specific distinctions. I entertain no doubt, on comparing it with my specimens, that Sherard's Plant was sent from Cornwall. Being thus separated as a new species, I have named it in honour of that eminent Botanist, in whose collection the original Specimen has been handed down to us.

V A R. α.

I here notice a narrow-leaved Variety with the fructification confined to the little forked tips. Its frond is of an equal breadth, not exceeding one-eighth of an inch: the height similar to the Plant above described. I have given no engraving of this Var. but in its place I insert a small Specimen, fig. 2. which is either this Plant in a junior or dwarf state, or a different Species, as fructification seemed to be incipient at *b*. May not this be *F. distichus* of Lightfoot?

Hab. near FOWEY, CORNWALL.

^a Gmelin enlarges still further this Species, including in it *F. spiralis* of Ray.

^b The Drawing, t. 8. f. 10. has not the slightest spiral habit.

F U C U S P I N A S T R O I D E S.

FUCUS. fronde tereti, ramosissimâ; ramis densè imbricatis; ramulis brevibus, obtusis, fursùm tendentibus; simplicibus, vel furcatis. *Herb. Buddle.* p. 18. 3. p. 19. 4.—*R. Syn.* p. 50. n. 46—*Gmel.* p. 127.—*L. Tr.* v. 3. p. 222.

RADIX fibrosa, faxis agglutinata.

CAULIS lignosus, validus.

RAMI irregulares, ex omni parte.

RAMULI incurvi, brevissimi, quanquam inæqualis longitudinis; simplices, vel ramofi; apicibus obtusis, apertis, vel fractis.

FRUCTIFICATIO—in quibusdam vesiculæ summâ parte convolutæ; feminum serie intus simplici vel binâ; in aliis, racemi globulorum.^a

O B S E R V A T I O N E S.

SPECIES hæc ubique ferè in littoribus nostris occurrit. "Pinus maritima vel *F. teres*" a Rajo nuncupatur, unde nomen *Pinastroides* sumptum. Structura interna septis ad intervalla distinguitur: tubulus quoque capillaris

^a "Globuli sessiles, vel pedunculati" ait D. Gmel. forsan vesiculæ supradictæ, ut statu sicco apparent; aliàs trimorpha fit fructificatio.

in centro caulis et ramulorum extenditur; cortice tamen opaco obvoluta hæcce oculos planè fugiunt. Quocirca a Botanicis formâ externâ inductis Species hæc, utpote et *F. diffusus*, et *F. Lycopodioides*, inter Fucos recensetur Habitum Fuci hujus, prout ab HUDSONO describitur “foliis sc. fecundis” negat se unquam vidisse D. GME-LIN: femina tamen vel globulos creberrimos in specimine suo describit, adeo ut necesse est varietates duas constitutare.

VAR. α . *Pinastroides*—fronde densissimè obvolutâ ramulis setaceis, brevissimis, ex omni parte: apicibus Pinæ in modum obtusis.^a

VAR. β . *Incurvus*—*subtus*, fronde vestitâ ramulis undique, rariùs tamen: *suprà*, ramulis duplici ordine fecundis, et forcicis in modum curvatis.

^a Habitum malè exprimit Gmelini Icon; verba tamen satis aptè describunt imbricationem Pinique habitum frequenter a me in Devoniâ visum.

SEA PINE.

PL. XIII.

FUCUS. frond cylindrical, much branched: principal branches closely tiled with short crooked spinous shoots; simple or forked; obtuse, or broken at the tips; pointing upwards.

(PLATE. *Gmel. t. 11. f. 1.*)

ROOT fibrous, matted, agglutinated.

STEM woody, cylindrical.

BRANCHES irregular, on every side of the stem.

TILING BRANCHLETS crooked; short, but unequally so; simple or branched; with blunted, open tips.

FRUCTIFICATION. Either in catkin-shaped vessels, rolled in at the tips with a single or double row of imbedded seeds:^a or in some instances exhibiting a *raceme*, or short branched tuft of granules.^b

OBSERVATIONS.

I HAVE arranged this Species as a *Fucus* on the authority of Ray, Gmelin, and Hudson, and latterly of Dr. Goodenough and Mr. Woodward, though with strong marks of doubt.

The upper parts exhibit, when held to the light, internal *septa*; but in the lower branches and stem the thickness and opacity of the skin excludes the light. On examining, however, a transverse slice under the microscope, and paring off the skin of the stem longitudinally on each side, I have discovered that there is a capillary tube running through the centre of both stem and branches; a structure which is sufficient in my opinion to constitute an intermediate *Genus*.^c

On considering Gmelin's description, and comparing it with that of Mr. Hudson, and likewise from my own actual observation, I shall divide the Species into two Varieties, viz.

VAR. α . *Pinastroides*. frond thickly tiled, and scabrous; with the summits of the shoots blunted like those of the Pine-Genus.

VAR. β . *Incurvus*. frond not so thickly tiled at bottom: upper branches producing two rows of shoots on the inner sides, with the tips forcipated.^d

^a See Pl. XIII. b. magnified summit: c. a catkin-shaped seed vessel of this tip more highly magnified, with the two imbedded rows of granules. d. a summit of Var. β , with the rolled up catkins as seen under a microscope by me, December, 1800, in a Specimen recent from Bognor Rocks. ^b See Pl. XIII. ff. ^c See Pl. XIII. e. ^d In Pl. XIII, both varieties are delineated.

This Species abounds on our shores; its height is about 6 inches; colour purplish, inclining to black. The extraordinary circumstance respecting Fructification described above, and actually seen by me, as I have delineated it, cannot fail to elucidate at some future time the theory of fructification of Marine Plants. There are similar Anomalies observable in *F. coccineus*, *F. diffusus*, and some others.^f

Hab. on the S. W. Coast most plentiful.

^e See Pl. XIII. b, c, d, f. ff.

^f See Observations on this subject in the Preface.

FUCUS HYPOGLOSSOIDES. TAB. XIII.

FUCUS. caule ramoso, foliis lineari-lanceolatis, alatis, planis, integerrimis, reticulatis; nervo prolifero. *Act. Linn. v. 3. 115.*

RADIX, callus minutus plures emittens caules.

CAULIS ramosus: ramis subalternis.

FOLIA numerosissima, pedunculata, angustissima, tenerrima.

FRUCTIFICATIO: granula in superficie foliorum in maculis oblongis^a disposita.

OBSERVATIONES.

Fucus hujusce, utpote Speciei distinctæ a me in CORNUBIA repertæ, *Act. Linn. 3. 115.* mentio fit. Fructificationem duplicem *F. hypoglossi*, plantulæ huic nostræ affinis, accuratè descripserunt D. D. GOODENOUGH et WOODWARD: in quibusdam sc. “tubercula parva ruberrima, in ipsâ costâ sita:” in aliis, “granula minutissima, rubra, in membranis ad utrumque costæ latus ordinatim disposita.” Hisce inductus, D. SOLANDER in M. S^o. in Bibliothecâ Bankianâ deposito species duas olim constituit; “si non sint reputanda, (ut ipse ibi innuit) pro mari et fœminâ ejusdem speciei.” In re tam difficili maxima adhibenda est cautio et plenior opus est investigatione, præsertim cum in allis speciebus fructificationem duplicem, vel dimorpham observavimus.^b Itidem, si verum est specimina tuberculata et punctata in littoribus a se remotis reperiri^c proculdubio Species reverà distinctæ sunt.

Frons Speciei suprâ descriptæ *F. hypoglossi* totis partibus minor est: latitudo folioli vix sesquilinearis: ramuli confertissimi et sine ordine. Color, haud ut in *F. hypoglossi* lætè ruber, sed pallidè rosaceus, et in plurimis speciminibus apices lutei, vel luteo-virides cernuntur. Textura frondis, si microscopium adhibeas, eleganter reticulata.^d

Hab. Litt. Occident. Angl.

^a Forfan ex pericarpio disrpto sed nimis regulariter videntur disposita.

^b Vide quæ notavi in *F. pinastroidi* supra.

^c *Act. Linn. 3. 116.*

^d Vid. Tab. XIII. g. Texturæ frondis *F. hypoglossi*, *Act. Linn.* nulla fit mentio: adeoque, ut minimè credibile est in frondis investigatione respectu fructificationis, reticulationem istam inobservatam fuisse, species duas saltem statuendas necesse est.

FUCUS HYPOGLOSSOIDES. PL. XIII.

FUCUS. stem branching; leaves linear-lanceolate, smooth, entire-edged; texture reticulated; midrib producing leaflets.

(No Plate.)

ROOT



ROOT a minute knob, producing numerous shoots.

STEM branching: branches sub-alternate.

LEAVES very numerous, pedunculated, very narrow, and tender.

FRUCTIFICATION—granules disposed in oblong patches of a regular form.^a

OBSERVATIONS.

I HERE introduce the minute delicate Species announced as a recent discovery of mine by Messrs. GOODENOUGH and WOODWARD.^b It is much smaller, and the leaves are narrower than those of *F. hypoglossum*: the form of the leaves likewise is more oblong, and its colour much paler: but the principal specific distinction is its beautifully reticulated frond. This we may safely conclude is peculiar to it, as under the examinations of the frond of *F. hypoglossum* to detect its mode of fructification, which must have taken place with the assistance of a microscope, this singular structure would not have remained unnoticed. Messrs. Goodenough and Woodward describe a dimorphous fructification in *F. hypoglossum* first noticed in a M. S. of Dr. SOLANDER'S, accompanying some Specimens in the *Banksian Library*,^c which the Dr. seems to think *Diæceous*. Many recent instances of a similar nature will be found described and delineated in this work, together with some observations made on this curious subject,^d which merits further investigation. This double fructification has not however occurred to me in this Species.

It is a common Parasitical plant on the stems and tips of other *Fuci* in the West of England and at Poole and the Isle of Wight, and grows in thick matted clusters, very delicate and tender. The tips often variegated with greenish yellow. The stems and older branches grow opaque, and are of a dull brown.

Hab. S. W. Coast, from I. of Wight to Land's-End.

^a Mr. Woodward in a Letter supposed that the patches might arise from the explosion of a pericarp, but they are I think too regularly placed. See Pl. XIII. g.

^b Linn. Tr. 3. p. 115.

^c See Linn. Tr. 3. 114.

^d See *F. pinastroides*, and Preface.

FUCUS LACERATUS.

TAB. XIII.

FUCUS. fronde tenui, tenerrimâ, diaphanâ, aveniâ; ramis sublinearibus, undulatis; apicibus obtusis, irregularitèr furcatis.

RADIX, callus minutissimus.

CAULIS, o, vel brevissimus.

RAMI sese dilatantes, dein lineares; margines plani, vel foliolis pedunculatis instructi.

FRUCTIFICATIO; tubercula propè margines, vel in foliolis.

OBSERVATIONES.

F. Laciniati varietatem β . Aët. Linn. a Synonymis ejus separo. Ex perbrevis apud D. HUDSON *F. laciniati* descriptione, herbario ejus combusto, dubium est an Species illa eadem sit ac supra descripta.^a Certum est tamen *F. crispatum* ejusdem Auctoris diversum esse. Verbis aptissimis Speciem in occidentali Angliæ parte solummodo repertam sub nomine *F. crispati* in ed. 2dâ. describit D. HUDSON. Margines totius frondis non cillis aut

^a Ex voce "dilatata" in ch. specif. Hudsoni suspicor *F. laciniatum* habitu ramificationis a *F. crispato* minimè differre, sed solummodo margine lævi, vel crispato, et structurâ frondis.

foliolis

foliolis stipitatis, instructi, sed regularitèr admodum fimbriati et corrugati; etsi quò planius appareat marginis pulchritudo, microscopio opus sit. ^b

F. endiviæfolius Lightfoot. cujus exemplar penes me est, non nisi habitu ramificationis ^c a nostro differt. Icon a specimine Dⁿⁱ. TURNER delineata, partiumque, ut suprà, descriptio Speciem hanc discriminabunt. Magnitudo frondis variat paullulùm; media in tabulâ representatur; color dilutè purpureus, non saturè ruber, ut in *F. crispato*.

Hab. in orientali Angliæ littore.

^b Vid. marg. *F. caispati* auctam, Tab. xv.

^c Frondis habitus multò magis dilatatus quam in *F. lacerato*; apices quoque convoluti, non crispati.

LACERATED FUCUS.

PL. XIII.

FUCUS. frond thin, slender, pellucid, without veins; branches sublinear, undulated; summits obtuse, irregularly forked. *F. Lacerat. var β. Linn. Tr. 3. 155.*

(No Plate.)

ROOT, a minute callous Knob.

STEM, 0; or very short.

BRANCHES dilated near the base, afterwards linear; margins plain, or garnished with pedunculated leaflets.

FRUCTIFICATION. Tubercles near the margin, or in the leaflets.

OBSERVATIONS.

MESS^{rs}. GOODENOUGH and WOODWARD unite *F. crispatus* and *laciniatus*, Hudf. *F. endiviæfolius*, Lightf. and *F. laceratus*, Gmel. ^a under one Species. “This has not been done,” they say, “without repeated examinations of their several properties.” It is difficult to decide on specific characters in any situation where recent Species do not abound, as is the case near the Sea-shore. So many experiments of paring off the external coats, cutting of slices, &c. which cause the destruction of specimens, must be repeatedly tried, that in no other situation can it be possible to ascertain with precision the nice points of discrimination between kindred plants. I have for several years cautiously attended to the beautifully fringed *Fucus*, which abounds in the Western part of Cornwall, which I have no doubt, as his Specimens are not in existence to settle the dispute, was the *F. crispatus* of Hudson, 2d. edit. and collected on the spot where I find it abounds. ^b That younger Specimens of this *Fucus*, with plain margins, may not have furnished him with the Species which he denominates *F. laciniatus* in his 1st. edit. and continues in his second, I will not aver. The beautifully *godrooned* edge, which will bear examination under a microscope, does not come out in the early stages of the plant, but there seem so many sportive forms of this Species and its affinities on every coast, that we may hereafter expect to see them separated into distinct Species. Internal structure, as I shall describe under *F. crispatus* clearly separates that species from the one under description. *F. endiviæfolius*, Lightf. in texture resembles our Plant, but it has a much more widely expanded ramification. I have a specimen, which I may delineate for the Appendix, leaving future Botanists to settle whether it should be a Species, or Variety. The Specimen delineated Pl. XIII, is of a Plant about the middle size; the colour, pale purple.

Hab. N. E. Coast.

^a *F. laceratus*, Gmel. t. 21. f. 4. is a trailing species: the edges are represented with small irregular stellated appendages, much longer than any I have seen, and giving no idea of the beauty and regularity of the edges of *F. crispatus*. It appears to be a foreign specimen, though, as the E. Indies and the Town of Harwich are united in the Habitat of Gmel. p. 179, this fact cannot be ascertained.

^b Mounts-bay, Cornwall, *F. crispatus* is figured, Pl. xv.

FUCUS ALATUS.

TAB. XIII.

FUCUS. fronde subdichotomâ, membranaceâ, tenerrimâ, angustâ ; nervo intermedio ; ramulis decurrentibus. *Buddl. p. 12. n. 2. 6.*—*Petiv. p. 25. n. 4.*—*Gmel. 187.*—*R. Syn. 44. n. 20.*—*Mantiff. 135.*—*Hudf. 587.*—*Light. 951.*—*With. 4. 95.*—*L. Tr. 3. 142.*—*Esp. Ic. p. 20.*

RADIX, callus minutus.

CAULES plurimi ex eâdem radice, compressi, infrâ nudi.

RAMULI distichi, alterni ; apicibus acutis, vel furcatis.

FRUCTIFICATIO trimorpha ; tubercula parva sessilia ad ramos ; vesiculæ obovatæ axillares, feminiferæ ; congeries granulorum ordinatim dispositæ in apicibus furcatis. ^a

OBSERVATIONES.

PERELEGANS textura Fuci hujus, et color amœnissimè rosaceus est, quanquam sæpissimè viridi et flavo in eâdem plantâ variegatus sit, et nervus quandoque, alis albescentibus, ruber evadit. Frons tota in plano ramosa est. Margines membranæ undulati. Latitudine ramulorum multum variat, si modo sint varietates. Tria Specimina a se invicem multum discrepantia delineavit D. GMELIN. t. 25. ^b tria etiam ex herbario nostro in tab. XIII, fisco. Fructificatio, ut suprâ, modo quidam prorsus singulari, ut in Piræmio observavi. Varietates duas, ut ipse ait, *F. alati* nuperrimè statuit D. ESPER. tab. 3. quarum fig. 1^{ma} *F. dentato* affinium multo est quam *F. alato*, fig. 3^{ia}, habitu frondis et fructificatione nihil cum *F. alato* commune habet. *F. alatum* apud exteros rarissimè inveniri suspicor. D. GMELIN ait in Cornubiâ frequentissimum esse.

Hab. in CORNUBIA frequentissimè.

^a Vid. Tab. XIII. g, gg. h, hh. i, ii.

^b Fig. 1. tab. XXV. Gmel. malè representat habitum *F. alati* respectu ramificationis, et crassitudinis ramorum, membranæque lateralis per totam frondem protensæ. Fig. 2, var. latifoliam satis benè exprimit. Fig. 3. var. filiformem (non juniorem Plantam) respectu tenuitatis ramulorum accuratè exhibet, non tamen respectu ramificationis.

WINGED FUCUS.

PL. XIII.

FUCUS. frond membranaceous, subdichotomous, tender, narrow ; with a midrib pervading the membrane, and decurrent branches.

P L A T E S.

Gmel. 25. 1, 2, 3.—*Fl. Dan. 352.*—*Esp. t. 3 ?*

ROOT, a minute callous knob.

STEMS, many from the same root, compressed, naked below.

BRANCHES, distichous, alternate, with the summits various ; plain, forked, or leafy.

FRUCTIFICATION, of different kinds : sessile tubercles adhering to the lower branches ; axillary, obovate, pedunculate fruit vessels with seeds immersed ; granules in rows in the summits.

OBSERVATIONS.

THIS minute Species, for delicacy of texture and brilliancy of tint, constitutes one of the principal ornaments of our Sea-shore ; and, if we may believe Professor GMELIN, it is almost exclusively found on the Cornwall

Z

Coast.

Coast. ^a It is of various breadths, from a quarter of an inch to that of a coarse thread; though even in the latter case, it has a proportional membrane on each side of the branch. ^b The membrane is waved at the edges.

Its nearest affinity is *F. hypoglossum*, a species which like this varies much in breadth: but the margin of that Species is plain, and it always sends off leaflets from the nerve in the middle of the leaf. The decurrent habit of the branches is the consequence of the lateral membrane, and is not peculiar to this Species.

GMELIN has given three figures of different ages, as he says; but they are varieties, if not species. Fig. 1. Pl. 25, gives no idea of its slender branches, and of the membrane, which pervades the whole frond, either lacerated, or entire: fig. 2, is a tolerable representation of the broad-leaved varieties: fig. 3, exhibits the very slender filiform habit of our narrow-leaved varieties, excepting in the upper parts, but affords no idea of its mode of growth. Nor does the Professor, either in his description, or by a marginal representation of a small bit, establish the curious fact, that these branches of the breadth of small packthread, exhibit the perfect appearance of a midrib and two lateral membranes. ^c

Professor ESPER has very lately figured what he calls *F. alatus*, in two Specimens: fig. 1. A species more nearly related to *F. dentatus* than to *F. alatus*: fig. 2. something resembling our wide-leaved var. but differing in its mode of growth and fructification. This Publication convinces me, that the genuine *F. alatus* is confined to this Island, and probably to the Western part of it. ^d

^a No *habitat* is given in Linn. Tr. v. 3. 142.

^b See Pl. XIII. k.

^c See Pl. XIII. k.

^d For the threefold fructification mentioned in the detailed description above, see Pl. XIII. g, h, i.

FUCUS FIBROSUS.

TAB. XIV.

FUCUS. fronde filiformi, ramosissimâ: ramis primariis subdistichis: vesiculis innatis, ovatis, concatenatis; inferioribus majoribus. *Budd. p.* 18. n. 4, 5.—*Petiv.* 40. 5.—*Morif.* 646.—*R. Syn.* 49. 45.—*With.* 4. 87.—*L. Tr.* 3. 137.

F. abrotanoides—*Gmel.* 89, 90.—*Esper.* 67.

RADIX; callus, statu recenti sub-spongiosus, mollis.

CAULIS, ligneus, nodosus, solidus.

RAMI irregulares, fursum attenuati.

VESICULÆ aëriferæ, ramulis innatæ, solitariae; vel binæ, tresve, ordine moniliformi.

FRUCTIFICATIO. Vesiculæ mucosæ, seminiferæ, in apicibus ramulorum; papillis perforatis extus.

OBSERVATIONES.

SPECIES hæc, scopulorum perfundiorum incola, haud rarò altitudinis tripedalis reperitur, etfi in statû juniori pusilla sit et planè setacea; unde a D. HUDSON in ed. 2dâ. ut Species distincta sub nomine *F. setacei* ^a enumeratur. Apprimè tamen Botanicis cavendum videtur ne in errores incidant si fortè specimina sterilia, aut statû juniori, fructificatione nondum incipiente, in manus inciderint. ^b Bullæ aëriæ supradictæ juxta bases ramulorum quasi concatenatæ nascuntur, idque solummodò in adultis: superficies earum glaberrima et nitens; structura interna, ut in *F. nodoso*, &c. Notandum est descriptionem in Hist. Ox. *Fuci* hujus “ramulis tenuitatem Abrotani maris

^a Fl. Angl. 575.

^b In junioribus plantis vesiculæ aëriæ desiderantur.

æmulantibus,

“ æmulantibus, et veficulis lentis magnitudine ” minimè plantulæ nostræ convenire, ut ex icone liquet. Juxta basin caulis in adultis, et per totam frondem in junioribus plantis folia linearia nervo longitudinali cernere est. Unde libet conjicere ramulos per totam frondem maturâ ætate in sese convolutos formam cylindricam sumere.^c

Vesiculorum magnitudo necnon totius plantæ, ut in occidentali Angliæ parte reperitur, characterem distinctivum exhibet, quò a ceteris facillimè dignoscatur.^d

Hab. in occidentali Angliæ parte.

^c Idem evenit in *F. tamariscifolio*, *abrotanifolio*, &c. sed maximè omnium in *F. discordi*.

^d *F. baccatus*, Gmel. p. 89, in Act. Linn. Speciei hujus synonymus est: accuratiore tamen indagatione ab illust. SCHMIDEL qui fortè post procellam copiam ejus fatis largam propè DIEPPE in NORMANDIA invenit, *Gorgoniæ* potius quam *Fuco* annumerandus videtur. Icon Speciminis Schmideliani apud D. ESPEr tab. 54 representatur unà cum integumento subtùs carnosò necnon stirpe durâ et corneâ *Gorgoniis* propriâ Icon Gmelini secundum SCHMIDEL ramum brevissimum exhibet; quum naturalis Plantæ magnitudo 4 vel 5-pedalis sit.

FIBROUS FUCUS.

PL. XIV.

FUCUS. frond thread-shaped, much branched; primary leaves sub-distichous; air-bladders innate, of an oval shape, strung on the branches, decreasing in size upwards.

PLATES.

Morif. t. 8. f. 17.—Esp. Ic. 29. 29 A.

ROOT, a tough spongy callous basis, when fresh from the sea.

STEM woody, knotted, solid.

BRANCHES irregular, branching upwards.

AIR-BLADDERS, strung on, like the beads of a necklace, two or three in a row; sometimes solitary.

FRUCTIFICATION: mucous vessels with seeds in the inside, and perforated, external *papillæ* coming out in the tufts which crown the upper air-bladders, similar to that of *F. ericoides*.^a

OBSERVATIONS.

THIS is one of the most beautiful of the larger Species of *Fuci*, on account of its elegant ramification, and its very conspicuous shining air-bladders which appear on every branch. The stem and branches all taper upwards, and the latter gradually shorten towards the top, so as to form a pyramid. The bladders do not appear in younger plants: the Specimens at that period are either straggling, and setaceous, or very much huddled. In the former case, if indeed it is not a variety, it was mistaken by Mr. HUDSON for a distinct species, and arranged as *F. setaceus*. In the latter it might be mistaken for *F. fœniculaceus*.^b Messrs. GOODENOUGH and WOODWARD had observed^c linear leaves with a delicate midrib near the bottom of some Specimens: this I have found to be generally the case, and if the plant is held before a strong light, it will appear that the cylindrical leaves on the rest of the plant are formed by the rolling in of the edges, many appearing in this situation to be only imperfectly rolled in; a similar observation may be made with respect to *F. tamariscifolius*^d and its affinities, and has been observed lately more remarkably to happen in *F. discors*.

^a See Pl. XI. ii. k, k.

^b I once found a Specimen like this near WHITSUN BAY, PLYMOUTH, which puzzled me; but some others gathered with it, more expanded, and with a few bladders appearing, served to clear up my doubts.

^c Linn. Tr. 3. 147.

^d *F. ericoides*, L. Tr. 3. 130.

The fructification has not been noticed by any Author. In the summer I believe it is rarely, if ever, met with. A Specimen brought me from St. Ives, February 19th, 1800, was the first I ever found in a fructified state. The situation is in the tufted summits which crown the uppermost air-bladders. The stem and bases of the leaves swell into mucous vesicles containing the seed, and are furnished with exterior, perforated *papillæ* for their discharge. ^c

Messrs. GOODENOUGH and WOODWARD supposed *F. baccatus*, *Gmel.* to be a battered Species of *F. fibrosus*. It had to me somewhat of that appearance, though its habit still appeared singular and *sui generis*. However, since the publication of that volume, the celebrated Botanist Professor SCHMIDEL met with large quantities of this marine Production cast on the Coast of NORMANDY. Professor ESPEr has figured a Specimen, Pl. 54. From this Plate, and the Description, ^e it proves to be a species of *Gorgonia*, which grows to the height of four or five feet. ESPEr's Plate shews the fleshy integument of that *Genus*.

F. fibrosus is an inhabitant of deep, still waters, and does not abound except towards the Western extremity of this Island.

Gmelin mentions the English Sea as one of its *habitats*: it is surprising that he did not delineate it. Professor ESPEr confines it to the MEDITERRANEAN, and particularly the ADRIATIC Sea.

Hab. See above.

^c See Pl. XIV. b. c. c. and compare Pl. XI. i. i. k, k. It is pleasing to see such analogies in kindred species.

^e "Extus ad notabile spatium caudex obductus crustâ pilosâ, fuscâ, punctis in orbiculi formam: an igitur Spongiæ cujusdam primordium . . an alicujus Zoophyti structura est?"—Schm. It. Helv. et Germ. p. 78.

FUCUS CORONOPIFOLIUS. TAB. XIV.

FUCUS fronde subcartilagineâ, compressâ, ramosissimâ; ramulis obtusis, multifidis, incurvatis; tuberculis, globosis, marginalibus. *Herb. Buddle.* 12. 1.—*Petiv.* 25. 3.—*R. Syn.* 45. n. 23.—*L. Tr.* 3. 185.

RADIX discoides, complanata.

CAULIS compressus; nervo quasi intermedio.

RAMI sine ordine, fursùm attenuati; ramulis ex utroque latere numerosissimis, brevissimis, incurvatis.

FRUCTIFICATIO; tubercula pedunculata, vel sessilia, inter spinulas molles, ramosas, in marginibus sita. ^a

OBSERVATIONES.

Fucus coronopi-facie RAIJ, inspectis BUDDLEII et PETIVERI herbariis, ut species distincta in Catalogo D. D. GOODENOUGH et WOODWARD collocatur. *F. cartilagineus* HUDSONI forsan synonymus ejus audit; in dubio tamen sunt Auctores supradicti (*L. Tr.* 3. 186.) specimenibus ejus igni combustis. ^b Ramuli per totam frondem flexuosi et incurvati, anguli etiam ramificationum obtusiusculi. Habitus Plantæ quodammodò affinis *F. coccinei*, sed multis numeris major. Variat colore rubro, rosaceo, luteo, viridi, ut frequentè observavi in *F. coccineo* et maximè omnium in *F. cartilagineo*. In specimine ex insulâ VECTI ^c extremitates congestas, utpote in Synopsi RAIJ memorantur, modo singulari et pulcherrimo observavi. Specimen perfectissimum olim mihi de ACTON CASTLE ^d post procellam mandatum fuit: tres frondes, si ita dicam, ex unâ basi provenientes ad altitudinem ferè pedalem affurgebant. Color plantæ istius minimè rosaceus, sed fulvus, qui tamen exsiccatione in coccineum mutatus est.

Hab. in occidentali Angliæ parte.

^a Tubercula aliquando pediculis insistent absque ullo spinularum interventu.

^b Vide quæ notavi de *F. cartilagineo* penes D. WITHERING in Præfatione.

^c Specimen mihi a D. De LUC monstratum.

^d In sinu MOUNTSBAY in CORNUBIA.

FUCUS CORONOPIFOLIUS.

PL. XIV.

FUCUS. frond somewhat cartilaginous, compressed, much branched; branches, obtuse, multifid, curved; tubercles, orbicular, marginal.

(No Plate.)

ROOT discoid, flattened at bottom.

STEM compressed, wide; with a thick prominence in the middle.

BRANCHES without order, tapering upwards: branchlets very numerous and short, curving upwards.

FRUCTIFICATION; marginal tubercles, either sessile or pedunculate, situated in a fringe of forked, branching, soft spinules.

OBSERVATIONS.

THE examination of BUDDLE'S and PETIVER'S *herbaria*, where STEPHENS'S original Specimen of the *F. coronopi facie* of Ray is preserved, has enabled Messrs. GOODENOUGH and WOODWARD to ascertain this Species. It is more than probable that HUDSON'S *F. cartilagineus*^a was the same, though he has introduced a confusion of synonyms. Doubts, however, have been entertained about this fact in the Linn. Tr. 3. 186. and I think they are somewhat strengthened by Dr. WITHERING'S Specimens, asserted by him to have been "gathered at the Isle of Wight," and which are undoubtedly belonging to *F. capensis*.^b

The habit of this Species is somewhat resembling *F. coccineus*, but the size is much larger: in many instances equalling that of the *Cape Fucus*; it is subject, like *F. coccineus*, and more particularly the *Cape Fucus*, to beautiful variegations. The stem and principal branches are elliptico-angular, with the middle part projecting on each side sharp, like a nerve. I once received from ACTON CASTLE an entire plant after a storm, which consisted of three principal stems rising from a common base to the height of nearly a foot. Its colour was yellowish brown, when fresh from the sea, or rather a sorrel, but it dried to a pink colour.

The fructification of this Species is subject to vary; in its luxuriant state the margin is fringed with soft forked, branching spinules, among which the orbicular seed-bearing tubercles are intermixed like berries. It seems, however, at times to have simple pedunculate tubercles on the margins.^c These tubercles are almost black when ripe.

Hab. S.W. Coast, from I. of WIGHT to the LAND'S-END.

^a Dr. WITHERING has described this Plant under the name of *F. cartilagineus* from Specimens sent from CORNWALL, but he has made GMELIN'S *F. capensis* a Synonym.

^b See the detail of this fact under *F. cartilagineus* in the Preface.

^c Messrs. Goodenough and Woodward from their description of the fructification seem to have seen only battered, or at least imperfectly fructified specimens.

FUCUS BARBATUS.

TAB. XIV.

FUCUS. fronde filiformi, flexuosâ, ramosissimâ; fructificatione obovatâ, simplici vel congestâ, in summitatibus ramulorum. *L. Tr.* 3. 128.

F. fœniculaceus. *Gmel.* 86.—*Hudf.* 575.

F. granulatus? *L. Tr.* 3. 131.—*Fl. Dan.* 571.

RADIX, callus expansus?

CAULIS teres, fursùm attenuatus.

RAMULI, teretes, flexuosi; ex omni parte.

FRUCTIFICATIO; vesiculæ ovatæ,^a mucosæ feminiferæ; tuberculis externis; folio subulato, terminali.

OBSERVATIONES.

SPECIES hæc, *Fucus fœniculaceus* D. D. GMELIN et HUDSON, non tamen LINNEI, rarissimè in littoribus nostris projicitur. Frons ramosissima, ramulis caulem undique cingentibus; superioribus brevioribus. Ramulos terminant vesiculæ mucosæ feminiferæ, tuberculis, vel papillis perforatis extùs. Vesiculæ hæc reverà ex tuberculis binis vel ternis in unum congestis conficiuntur, figuram nudo oculo ovatam formantibus. Ex apice vesiculæ prodit folium simplex subulatum. Notulis hisce a *F. fibroso*, *fœniculaceo*, et *abrotanifolio* distinguitur.

Errorem Act. Linn. 3. 131. inesse suspicor, ubi *F. granulatus*, Linn. ut Species Anglica recensetur. In speciminibus a me observatis ramuli nonnulli tubercula remota, et quasi concatenata in folio subulato, terminali gerunt.^b Hinc inducitur, utpote et char. spec. Linnei “vesiculæ innatæ sed tamen remotæ” Speciem distinctam statuere D. D. GOODENOUGH et WOODWARD; quum tamen in eodem specimine characteres hi reperiuntur.

In Herbario Linneano *F. granulati*^c occurrit specimen fructificatione minimè congestâ, et ovatâ (ut in *F. barbato*), sed tuberculis ejusdem magnitudinis, contiguis, concatenatis; septem vel octo in eodem ramulo, species certè exotica. D. Professor ESPEr quoque nuperrimè *F. granulatum* sibi a D. SCHMIDEL a mari MEDITERRANEO missum, tab. 61. icone donavit. Tubercula, in hoc specimine, ut ex descriptione, et figurâ auctâ constat, in apicibus ramulorum duplici serie ex adverso posita cernuntur.^d Habitus etiam totius plantæ planè diversus.

Hab. in DEVONIA.

^a Si microscopium adhibeas vesiculis hisce feminiferis, bina vel tria tubercula congesta vel connata ut in Tab. XIV. 2, 2. 22, 22. deteges.

^b Vid. Tab. XIV. a, a, aa.

^c Granularis vocatur.

^d ESPErI descriptio verbis hisce continetur “Die Bläschen sind einzeln aneinander gereyhet. p. 120. Sie stehen theils an ener Seite des Zweiges, theils dazwischen — gewöhnlich aber liegen sie in mehreren Reihen ubereinander. ib.”

FUCUS BARBATUS.

PL. XIV.

FUCUS. frond filiform, flexuose, much branched: fructification; ovate, terminal tubercles.

PLATE.

Gmel. t. 2. A. f. 2.

ROOT, a callous knob?^a

STEM cylindrical, tapering upwards.

BRANCHES crooked, and waving; coming out on all sides of the stems.

FRUCTIFICATION; mucose vesicles, huddled together in a sort of oval shape, with internal seeds and external *papillæ*, terminated with an awl-shaped leaflet.

OBSERVATIONS.

THIS Species is rare, and has occasioned mistakes among our English Botanists, who, after the example of GMELIN, have given it the trivial name of *F. fœniculaceus*, which appears by the Linnean Herbarium to be a very differ-

^a It has not been found as yet perfect, but it is conjectured to be like its affinities in this respect.

ent Species.^b The detection of this error we owe to the great attention in the collation of Specimens of the Authors of the Dissertation on *Fuci*, L. Tr. p. 135. Its habit and the terminal congeries of mucous seed-bearing tubercles, if viewed with a common eye-glass, will distinguish it from its affinities, and it likewise is much smaller in its dimensions. Its colour is olive, which dries black.

On many branches of this Species you will observe one, sometimes two smaller tubercles strung on the subulate leaf: probably in some specimens it may obtain pretty generally. Messrs. GOODENOUGH and WOODWARD induced by this circumstance, and likewise by an expression in the Linnean specific character, have introduced *F. granulatus* as a British Species.^c Professor ESPEER has however lately given an accurate representation of a Specimen of *F. granulatus* from the Bay of NAPLES, Pl. 54, with a magnified twig which certainly is a distinct Species, and of which I have seen a Specimen.^d

Hab. DEVONSHIRE, and S. W. Coast.

^b *F. fœniculaceus*, Linn. is *F. concatenatus* of HUDSON, LIGHTFOOT, WITHERING, and VELLE: the latter has figured it, and according to the Plan adopted by me it will not be engraved. See Appendix. It differs from *F. concatenatus*, Linn. which is a Mediterranean Plant, and improperly referred to by Mr. HUDSON.

^c I incline to think there may be a variety of *F. barbatus* from the descriptions of HOUTTUYN, 293. n. 23. and GUNNER. Fl. Norv. 2. 139. n. 1071. ESPEER's *F. granulatus* from his Description and Plate is certainly a distinct Species. This may be cleared up when more British Specimens are discovered, or by communications from Northern Botanists.

^d Mr. WOODWARD's own Specimens have the Summits as at a, aa, Pl. XIV.

FUCUS ABROTANIFOLIUS. TAB. XIV.

FUCUS. fronde filiformi, compressâ, pinnatâ: ramulis extremis vesiculosis; foliolis è vertice vesicularum, multipartitis, obtusis.—*D. Læfing, Herb. Linn.*—*L. Sp. Pl.* 1629.—*Huds. Flor. Ang.* 575.—*L. Tr.* 3. 126.

RADIX, discus explanatus?

CAULIS cylindrico-compressus, crassitie pennæ corvinæ, fursùm attenuatus.

RAMI sub-pinnati, vel sine ordine; superiores breviores.

RAMULI, multifidi, flexuosi, obtusi.

FRUCTIFICATIO in vesiculis et apicibus—tubercula minuta seminifera?^a

OBSERVATIONES.

HERBARIUM Linneani possessioni usufructuariæ, si ita dicam, necnon curis D. D. GOODENOUGH et WOODWARD debetur quòd Species hæc, præcedenti, adhuc rarior, in Catalogo Anglicano locum suum obtineat. Specimen Dⁿⁱ LÆFLING ibi conservatum et Cl. LINNEO ex ANGLIA missum accuratè descripserunt Auctores supradicti, L. Tr. 3. 126. Specimen istud nuperrimè examinavi, veniâ mihi liberalitèr admodùm a D^{no} SMITH concessâ, et descriptionem Act. Linn. l. c. cum plantâ siccâ collatam comprobavi. Specimen item penès D. WOODWARD, aliudque, sed id cursim, penès D. LAMBERT titulo Hudsoniano^b subscriptum examinavi. Descriptioni Act. Linn. 3. 126. vix quidquam addendum videtur: icon certè desiderabatur; hanc ex specimine Dⁿⁱ WOODWARD magnitudinis naturalis in Tab. XIV, fisto.

Maximè affinis videtur *F. fœniculacei*, Linn. vesiculæ in utroque mucosæ potiùs quam aëriferæ; in posteriore tamen in axillis, et in medio ramulorum concatenatæ cernuntur. Vesiculæ hæ quoque *F. tamariscifolii* similes sed minores.

^a Vid. Tab. XIV. β. γ γ γ.

^b Ibi *F. barbatus* perperam nuncupatur.

Fructificatio secundum D. GOODENOUGH et WOODWARD, tuberculis minutis conficitur; licet ex analogiâ conjicere fas sit, tubercula ista solummodò papillas esse, feminaque intus muco obvoluta generari. In speciminibus tanti pretii minimè experiri licuit: viderint ergo Posterì.

Hab. in occidentali ANGLIÆ parte rarissimè.

^c In *F. fœniculaceo*, Linn. et in *F. discordi* femina intus sita sunt, papillis conicis extus. Vid. Tab. xiv. β, γγγ.

FUCUS ABROTANIFOLIUS.

PL. xiv.

FUCUS. frond thread-shaped, compressed, pinnate; bladders near the extremity of the branches terminating in a multipartite leaf, obtuse, pointed.

(No Plate.)

ROOT, supposed to be a callous knob.

STEM cylindrico-compressed of the thickness of a Crow-quill, tapering upwards.

BRANCHES sub-pinnate, or without order; decreasing in length towards the summit.

BRANCHLETS multifid, flexuose, blunted at the tips.

FRUCTIFICATION in the vesicles and on the terminating shoots—consisting of minute seminiferous tubercles.^a

OBSERVATIONS.

WE are indebted for the accurate knowledge of this Species to the careful examination of the *Linnean Herbarium* by Messrs. GOODENOUGH and WOODWARD. The original Specimen of LÆFLING is there preserved. I have lately, by favour of our excellent President,^b examined the same Specimen, and compared it with the description in the Linnean Transactions. I have likewise examined the only existing Specimens of this rare Species that I know of. Mr. WOODWARD kindly intrusted me with his, for the purpose of presenting the Reader with the annexed delineation. No specimen that I have seen has the callous base from whence it is supposed to grow. Mr. LAMBERT's specimens, the remains of the late Mr. HUDSON's Collection, which I saw three years ago in company with Mr. TURNER, were in a very battered state, and imperfectly expanded. I think there can be no difficulty in discriminating this Species from its affinities, by attending to the specific and detailed character as above, with the assistance of the engraved Representation. Its nearest affinity is *F. fœniculaceus*, Linn. The fructification is described in the L. Tr. from the dried Specimen. It could not be expected that investigation by soaking, and the application of the knife, would have been permitted in the case of so rare a Specimen, but from analogy I should conclude that the small external tubercles would prove to be *papillæ* shrunk up by drying, and that the seeds lay in masses involved in *mucus* within the skin.^c

Hab. On the S. W. Coast: the precise Spot is not mentioned.

^a See Pl. xiv. β. γ. γ. γ.

^b James Edward SMITH, M. D. President of the Linnean Society.

^c See the Fructification magnified, β. γ. γ. γ. tab. xiv. and compare the magnified Drawings of *F. tamariscifolius* and *F. fibrosus*. N.B. I did not venture to macerate the Specimen.

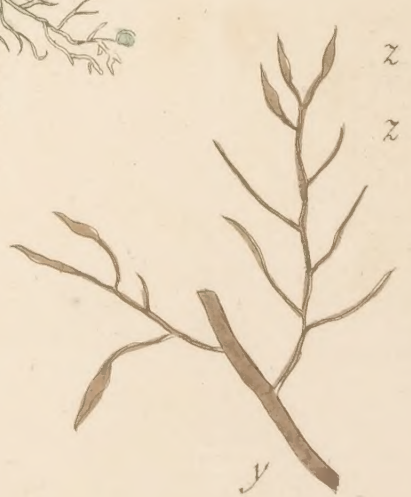
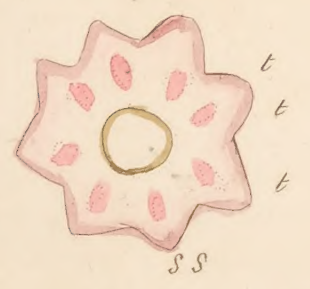
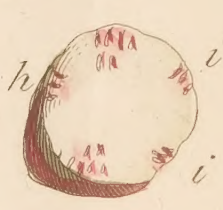
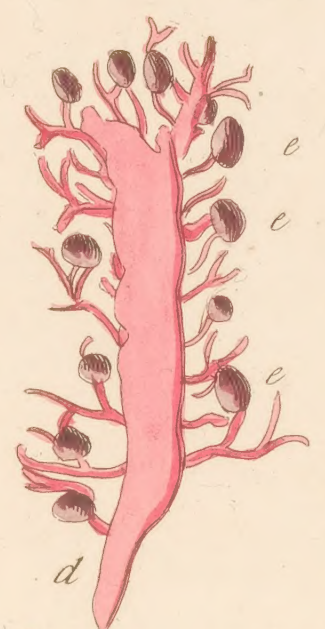
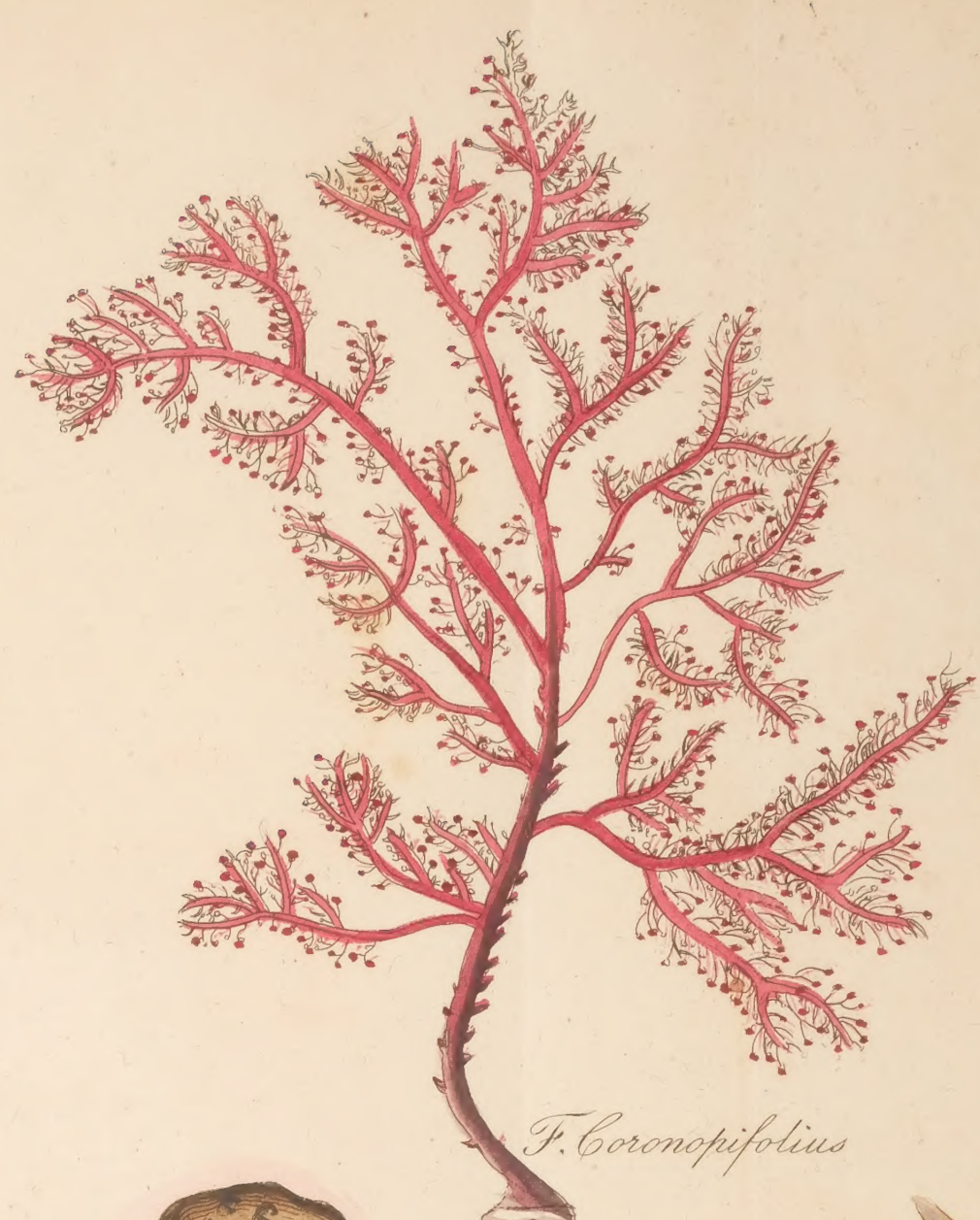
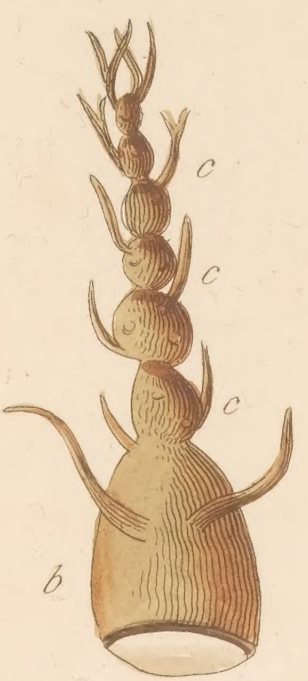
FUCUS AMPHIBIUS.

TAB. xiv.

FUCUS fronde filiformi, ramosissimâ; ramis sub-alternis; ramulis capillaribus apice convolutis.—*R. Syn.* 38.—*Hudf.* 471.—590.—*With.* 4. 116.—*Aët. Linn.* 3. p. 227.

F. scorpioides.—*Gmel.* 135.

RADIX



RADIX è fibrillis compofita.

CAULIS, filiformis, cartilagineus, ad bafin ramosus.

RAMI capillares, implicati, apicibus convolutis.

FRUCTIFICATIO in cirris terminalibus, qui maturâ ætate in racemum explicantur, ^a fructibus acutis.

OBSERVATIONES.

HABITUM Fuci hujus fingularem exactè exprimit Icon RAY SYNOPSIS, t. 2. f. 6. in parvo tamen, et caule, refpectu plantæ magnitudinis, craffiufculo. Satiùs tamen fore judicavi fpecimen penes me contra institutum meum, ^b delineare de novo. In editione 1^{ma} Dⁿⁱ HUDSON, utpote in Hift. Fuc. Dⁿⁱ GMELIN, Species hæc nomine fatis apto *Scorpioides* audit : nomen triviale “amphibius” a D. HUDSON in ed. 2^{da} et in Act. Linn. 3, p. 227. inditum, quoniam in foffis mari vicinis, aquâ falsâ et dulci vicibus alternis repletis, proveneat.

In Act. Linn. varietates duæ recensentur, var. α , Rajana, var. β , noſtra ; neſcio tamen an ita ſe res habet. Fructificatio a D. GMELIN, et in Act. Linn. deſcribitur quaſi tuberculofa, et muco in apicibus cirrorum obvoluta ; accuratior tamen inveſtigatio a D^{no} TURNER nuperrimè habita probavit apices iſtos mucosos, ætate evolvi, fructu racemoſo, ovato, acuto, terminali, ut in icone repreſentatur, t. xv. z, z. *F. ſcorpioides*, D. ESPEY, Speciem plane diverſam exhibet ; ſuſpikor etiam ex deſcriptione *F. ſcorpioidem* D. GMELIN minimè eundem ac *F. Scorpioidem* noſtratam eſſe.

Hab. prope YARMOUTH.

^a Vid. Tab. xv. y, z, zz.

^b Vid. Præf. Angl.

AMPHIBIOUS FUCUS.

PL. XIV.

FUCUS. frond thread-shaped, much branched ; branches ſub-alternate ; branchlets capillary with their ſummits rolled in.

P L A T E.

Ray, Syn. t. 2. f. 6.

ROOT compoſed of ſmall fibres.

STEM thread-shaped, cartilaginous, branching from the bottom.

BRANCHES capillary, interwoven ; with curled ſummits.

FRUCTIFICATION in the terminal rolls which when advancing to maturity become ſtrait, and exhibit a raceme with oval ſharp-pointed fruit. ^a

OBSERVATIONS.

THE Representation of this Plant in RAY's Synopſis is accurate, but I ſuppoſe it to be reduced, as it is ſo much leſs than I ever ſaw it : Dr. GOODENOUGH and Mr. WOODWARD have however called it a Variety. At all adventures I am induced to give a delineation of it from a Specimen furniſhed by my Friend Mr. D. TURNER. HUDSON's original name *Scorpioides*, taken from Profeſſor GMELIN is deſcriptive of its habit, and better in my opinion than *F. amphibius*, which appears in his 2^d Ed. and which has been copied in the L. Tr. 3. 227 ; a name given from its growing in ditches near the ſea, whoſe waters are alternately ſalt and freſh. Its habit of ramification diſtinguiſhes it from every other, and requires no farther detail. The fructification in its mature ſtate has not been noticed. It has been lately ſent to me by Mr. TURNER, and exhibits a Raceme as figured in the Plate xv. y, zzz.

^a In Linn. Tr. feminiferous tubercles are ſaid to be contained within the rolled ſummits : this is the ſtate prior to the evolution of the raceme, and is extremely analogous to *Scorpioides* among Land Plants.

Professior ESPER has lately figured *F. scorpioides*, Pl. xxxiii. His n. 1, is an exact representation, as to habit, of *Conserua polymorpha*; but the detached Plant, n. 2. is different, and the magnified Representation, n. 3, shews a sort of Fructification, differing from any Species I have yet met with.

Hab. S. E. Coast near YARMOUTH and WISBECH in Ditches.

FUCUS FASTIGIATUS, *Linn.* TAB. XIV.

FUCUS. fronde sub-dichotomâ, ramosissimâ; ramis fastigiatis obtusis; tuberculis lateralibus apice complanatis. *Morison.* 649?—*Petiver.* 31. n. 4.—*Linn. Tr.* 3. 199.

RADIX; callus minutus statim è basi furculosus; furculis ramosissimis, radicanibus.

CAULIS ad basim furculis vestitus, suprà nudus; prælongus.

RAMULI primò dichotomi, dein sine ordine; ad apices confertissimi.

FRUCTIFICATIO; tubercula sub-conica, depressa; versus medium ramorum.

OBSERVATIONES.

BOTANICORUM nostratum^a secutus exemplum *F. lumbricalem* D^m GMELIN sub nomine *F. fastigiati* in priore Fasciculo descripsi, hætenus ineditâ Differtatione de Fucis D. D. GOODENOUGH et WOODWARD. Horum tamen auctoritate, inspectisque nuperrimè a me Herbarii Linneani speciminibus, Speciem hanc sub nomine *F. fastigiati*, *Linn.* fisco. Et si è callo minimo oriatur Fucus hic, caulis tamen ad basim maximè omnium furculosus. Habitus Plantæ ad apices minimè dichotomus, sed irregularis, ramulique quam in affinibus tenuiores. De MORISONI figuris n. 4 et 9. tab. ix, vix ausim affirmare; variam *F. lumbricalis* ramificationem præ se ferre videntur. Ut ut se res habet Specimina omnia *F. lumbricalis*, *fastigiati*, et *radiati*, penès me ad examen nuperrimè revocaui, et characteribus ex fructificatione sub microscopio minimè ambiguis in species plures separavi.^b

Hab. passim.

^a HUDSON, LIGHTFOOT, and WITHERING.

^b Vide notulam (d) descriptioni Angl. subjunctam.

FUCUS FASTIGIATUS, *Linn.* PL. XIV.

FUCUS. frond sub-dichotomous;^a summits fastigiated with blunt tips: tubercles lateral, scattered, flatted at top.

PLATES.

Morison, t. 9. f. 9?—Flor. Dan. 393.—Esper. Ic. t. xvi.

ROOT, a very small knob immediately becoming covered with shoots.

STEM, naked at bottom.

BRANCHES at first inclining to dichotomy; then irregular; much crowded at top.

FRUCTIFICATION: conical tubercles, flatted at top, situated low down or towards the middle of the Plant.

^a *Linn. Tr.* 3. 200, says the summits are often trifid: in fact, the dichotomy is extremely irregular towards the tips, 2 or 3 branches often coming out on one side.

OBSERVATIONS.

I DESCRIBED in a former Article,^b *F. lumbricalis* of Gmelin and Linn. Trans. under the trivial name of *F. fastigiatus*, following the example of our English Authors,^c the Dissertation above alluded to being then unpublished. I here insert *F. fastigiatus*, as I observed it in the *Linnean Herbarium*, the figure, Pl. XIV, being taken from a specimen in my possession. Its description as above will serve to discriminate it. Its stem and branches are finer than those of any of its affinities. I have lately examined various specimens in my possession, by cutting transverse sections through the summits, where the fructification appeared, and have discovered by means of the microscope incontestible marks of discrimination sufficient to arrange seven Species. These I have subjoined in a note with references to the magnified Drawings of these transverse sections in Pl. XIV.^d

Hab. not uncommon.

^b P. 15.

^c *Fastigiatus* and *Furcellatus* have been made different Species by HUDSON and LIGHTFOOT, and Var. α and β by WITHERING; though they are clearly the barren and fructifying summits of the same *Fucus*.

^d When I described *F. fastigiatus* in a former Fasciculus, I delineated two specimens under the idea of their being varieties. *F. lumbricalis*, L. Tr. which is the lower figure of my Pl. VI, has the fructification there represented in oblong decurrent vesicles, which is inaccurate, and must have been occasioned by mistaking some indurated mucus for a feed-vesicle. These oblong vesicles are however the specific characteristic of my upper figure in the same Plate, which is arranged below as n. 5. I have since had opportunities of examining various specimens of this latter Plant which is frequent in Cornwall, and it certainly is a distinct Species. The result of my examinations on the different Specimens in my possession is given in the subjoined List. The method taken by me was by cutting across with a fine instrument the fructified parts. Where the tubercle, or decurrent feed-vesicle, is external, the feeds are situated *without* the frond; where the fructification is effected by an inflation of the summits, the feeds are *within*.

Seeds kidney-shaped or curvi-linear, often barred across.

* within the external cuticle.

1. *F. lumbricalis*. frond dichotomous . . . feeds in orbicular masses, perforations invisible, but without any external papillæ. N.B. When mature, the summits curve inwards. t. XIV. f. g. g. h. iii.
2. *F. furcatus*. frond dichotomous . . . feeds naked, arranged in regular rows just within the cuticle; no visible perforations. t. XIV. n. o. p.
3. *F. fastigiatus* of Gmel. frond dichotomous . . . summits swelling into a vesicle with furrows in the outer coat; summit by decay discharging the feeds. N.B. In this species the feeds seem to be imbedded at the bottom of the furrows. LIGHTFOOT I think has described this Species. T. XIV. k, kk. l, ll. m, mm. different appearances.
* * without the external cuticle.
4. *F. radiatus*. frond dichotomous . . . feeds in echinated tubercles, either lateral or surrounding the stem; collected in oval masses. t. XIV. s, ss. t, t, t.
5. *F. lateralis*. frond dichotomous . . . feeds in oval masses, in smooth longitudinal vesicles, with a smooth outward coat. t. XIV. u, u, v, v.
6. *F. furcellatus*—*Fastigiatus*, Linn. Tr. (the subject of this article) frond dichotomous *** feeds in the inside of flat conical tubercles.*
t. XIV. q. qq. r. r.
7. *F. capitatus*. fronde dichotomâ. . . feeds in the inside of warty tubercles, situated among the tufted branches of the summits. Species from Bognor. w. x.

* I am not certain that these tubercles contain feed: they are found on the Dover Specimen of *F. fastigiatus*, n. 3, which has likewise fructified summits.

FUCUS RADIATUS.

TAB. XIV.

FUCUS. fronde filiformi, dichotomâ; ramis sub-æqualibus; summitatibus acuminatis; tuberculis feminiferis, verrucosis, scabris; lateralibus, vel amplexicaulibus. *Linn. Tr.* 3. 202.

RADIX, callus expansus, plures emittens furculos.

CAULIS nudus, cylindricus, subdiaphanus.

RAMULI dichotomi, intervallis æqualibus; angulis rotundiusculis.

FRUCTIFICATIO; verrucæ subrotundæ purpureæ, echinatæ, formam fructûs mori in parvo exhibentes; seminibus in massis ovalibus, formâ reniformi vel curvilineâ.

OBSER-

OBSERVATIONES.

F. radiatum, auctoritate D. D. GOODENOUGH et WOODWARD, nec non ex speciminibus mihi è NORFOLCIA transmissis, fisco. Speciem hanc accuratè admodum describere viri doctissimi, Act. Linn. 3. 202. Icon adhuc desiderabatur, nam de summitate *F. rotundi* apud D. GMELIN, t. VI. f. 3. utpote Speciei hujus synonymi, vix ausim affirmare. Fructificatione verrucosâ, scabrâ, capitulos Sphæræ entimorrhizæ adumbrante ^a ab affinibus distinguitur. Tres solummodo enumeravere species D. D. GOODENOUGH et WOODWARD; characteribus tamen a fructificatione sub microscopio sumptis, septem statuo.^b

Hab. YARMOUTH et in Orientalis ANGLIÆ littoribus.

^a Act. Linn. 3. 203.

^b Vid. notulam suprâ, *F. fastigiato*, Linn. Tr. subjunctam.

RADIATED FUCUS.

PL. XIV.

FUCUS. frond thread-shaped, dichotomous; intervals between the angles of dichotomy nearly equal; summits acuminate; tubercles rough and warty; either lateral, or embracing the stem.

(No Plate.^a)

ROOT, an expanded callous Disc, sending up several shoots.

STEM, naked, cylindrical, semi-transparent.

BRANCHES dichotomous, equal, forming roundish angles.

FRUCTIFICATION: echinated warts with oblong masses of seeds, which are kidney-shaped, or slightly curvilinear.^b

OBSERVATIONS.

THIS Species is said by Messrs. GOODENOUGH and WOODWARD to be the *F. rotundus* ^c of GMELIN, but the description is not sufficiently detailed to establish a specific difference, and the small summit, t. VI. f. 3, represents a smooth wart divided by a cleft. The singular rough-headed echinated wart is sufficient to distinguish it, added to the Disc which spreads wider than its affinities. There are only three Species enumerated in the Linn. Tr. and I accordingly insert no more in the body of the Work; but my Observations under the microscope authorize me to increase the number to seven including only those on which I have made actual Experiments.^d

Hab. on the Eastern Coast.

^a The Linn. Tr. quotes GMELIN'S Pl. VI. f. 3. but that is only a summit, and the tubercle is double with a smooth skin; and as the echinated surface is always observable in *F. radiatus*, I do not admit this synonym. See note on *F. fastigiatus*, containing a new and accurate Arrangement of the affinities of this Plant, which from shape of seed and other circumstances should form a new Genus.

^b The seeds are the same in *F. lumbricalis*, *fastigiatus*, &c. &c. See Pl. XIV. g, g.

^c ESPER has figured a very different Plant for the *F. rotundus* of GMELIN.

^d See Note under *F. fastigiatus* Linn.

FUCUS CILIATUS.

TAB. XV.

FUCUS. fronde aveniâ, ramosâ, ^a marginibus ciliis, vel ligulis instructis; radice fibrosâ. *Herb. Buddle.* 26. 4.—*Petiv.* 19. 2. 3.—*R. Syn.* 47. n. 33.—*Gmel.* 176? (ligulatus, 177. holotetaceus, 178.)—*Huds.* 580.—*Lightf.* 934.—*With.* 4. 104.

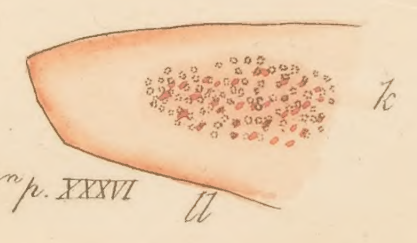
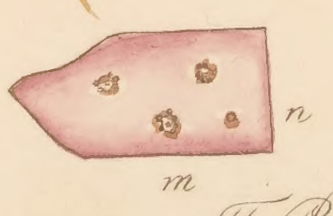
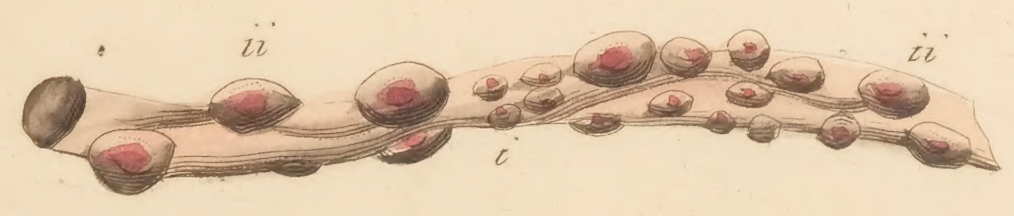
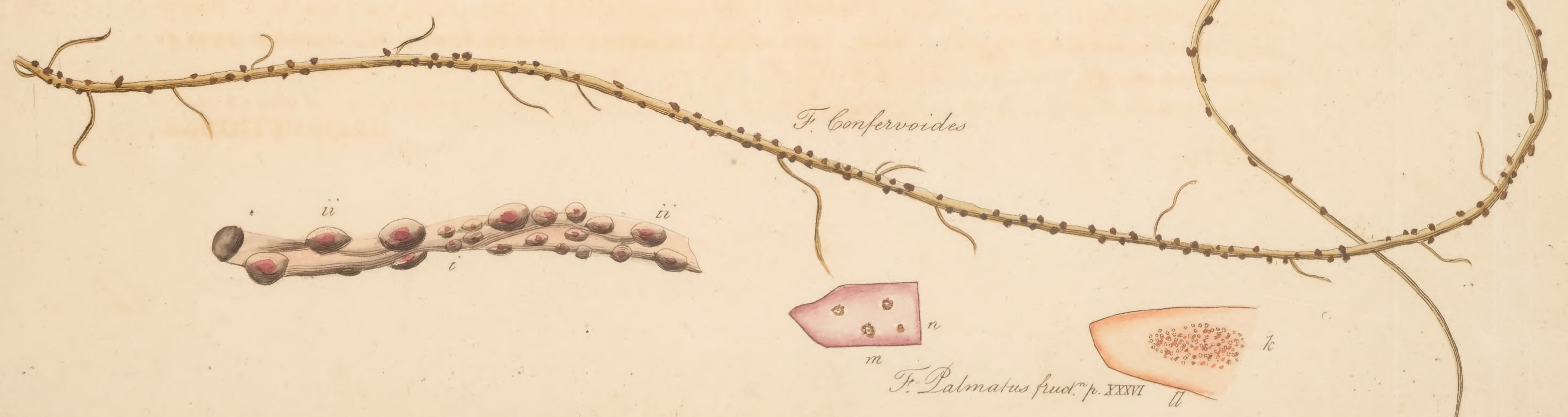
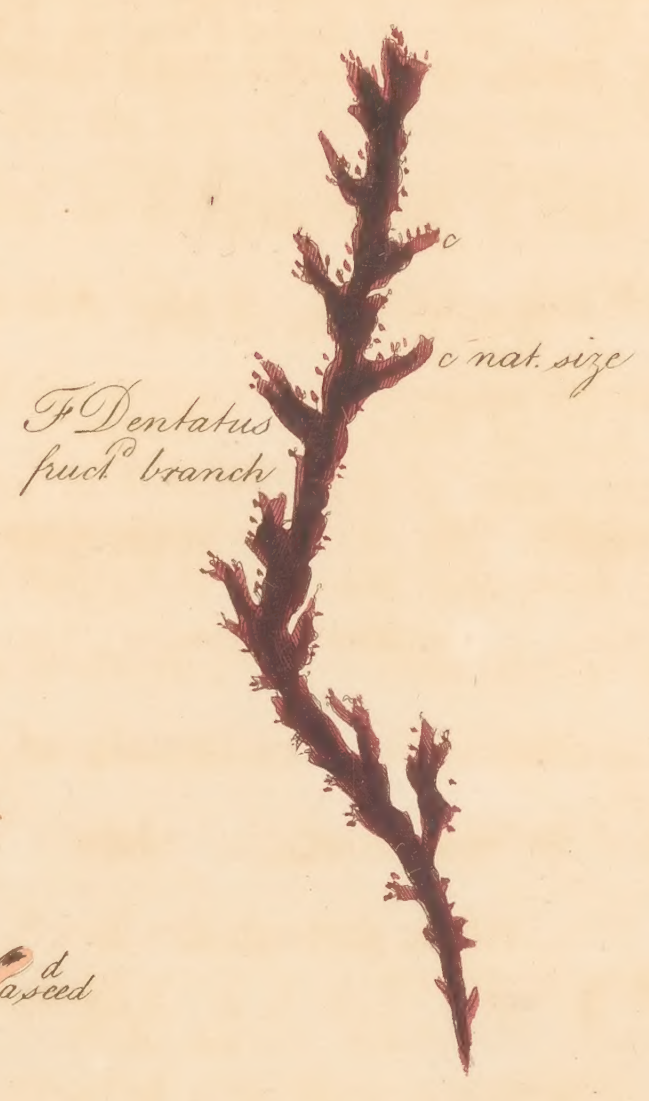
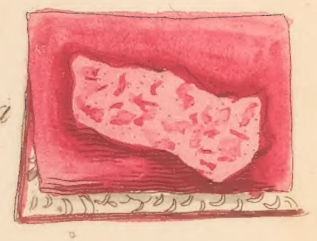
RADIX fibrosa.

CAULIS subrotundus, brevis.

FRONS simplex vel ramosa, marginibus ligulis inæqualis longitudinis instructis; grandioribus ciliatis.

^a Act. Linn. l. c. ita vocatur. Habitus autem frondis in Specimine primo, ligulatus est potius quam ramosus, ut in Icone videre est.

FRUC-



F. Palmatus fruct. p. XXXVI

FRUCTIFICATIO dimorpha—tubercula sub-pedunculata, in apicibus ciliorum, vel sessilia in margine—
granula minutissima in cute nidulantia in maculis irregularibus disposita. ^b

OBSERVATIONES.

SPECIES tres D. GMELIN, *F. ciliatus*, *ligulatus*, *holofoetaceus*, sub uno communi triviali nomine, Act. Linn. v. 3. 160, includuntur. Varietates duas statuit D. LIGHTFOOT; rectius forsan D. WITHERING species totidem sc. *F. holofoetaceum* et *lanceolatum*. Species hæc statu præsentī maximè omnium Proteiformis est. Miror equidem Auctores supradictos GMELINI oscitantiam in *F. ciliato* describendo minimè exprobasse. Descriptio equidem claudicat insignitè, et quid sibi vult Auctor qui in fronte tituli MORISONI characterem, p. 646. n. 10. ^c “ca-
“pillis longis fimbriatum” ostendit, planè nescio. Icon ejus t. XXI. f. 1. *F. laciniatum* adumbrat, prout observa-
runt D. D. LIGHTFOOT et WITHERING. Varietates tres, grandifoliam, lanceolatam, et filifoliam levi immutatione
(Var. prima enim *F. ciliatum* et *holofoetaceum*, Act. Linn. includit) iconibus separatim donatas fisco.

Var. α . . . fronde, ut suprà, latitudinem quatuor unciarum attingit, ligulæque primariæ pari modo sese am-
pliantes molem satis largam struunt, superficie utrâque ciliis mollibus, eodem modo ac secundariarum margines,
instructâ.

Var. β . . . fronde ramosâ; caule et ramis cylindricis sub-impressis, foliis ex apicibus ramulorum lanceolatis,
ciliatis. With. 4. 104. TAB. XV.

Varietas hæcce in occidentali ANGLIÆ parte occurrit, et quidem copiosissimè, superficie quoque in provectioni-
bus ciliatâ, sed præcipuè versus unam frondis paginam. Color, ut in superiore, saturè ruber vel olivaceus. Plan-
ta Parasitica ut plurimum; magnitudo, ut in Icone representatur.

Var. γ . . . fronde ramossimâ cylindrico-compressâ ramulis extremis compressis, ciliatis. TAB. XV.

Juxta PADSTOW, CORNUBIÆ, versus Boreale littus oppidum varietas hæc copiosè occurrit. Statu recenti
frons ferè cylindrica est, et ciliis ad extremitates ramulorum obsita. Cumulatim crescit. Structura frondis in
omnibus eadem, cuticula colorata glaberrima mucum album vasculosum operiens. Species certè edulis.

Var. δ . . . fronde ramosâ, ramis lineari-lanceolatis, ciliis æqualibus rectangulis, pectinatis. *F. Ptilotus*, GUNN.
et ESPER. TAB. XV.

Specimen in Icone delineatum cum *F. corneo*, tab. XII, immixtum inveni.

Hab. VAR. α , passim— β , γ , in Occidentali ANGLIÆ parte— δ , POLKERRIS, FOWEY, CORNUBIÆ.

^b Vid. duplicem fructificandi methodum t. xv, a, b. Proculdubio plures sub eodem triviali nomine continentur species, accuratiore fructifica-
tionis investigatione separandæ. Tubercula prout observavi in var. β sæpius occurrunt.

^c Character hic sine dubio *F. jubatum* designat.

CILIATED FUCUS.

PL. XV.

FUCUS. frond smooth, veinless, branching into flat *laciniæ*, or processes; having the margins
beset with *cilia*, or small soft spines, often swelling into leaves which are likewise cili-
ated.

PLATES.

Gmel. t. XXI. f. 2, 3.—Esper. Icon. t. IV.

ROOT fibrous.

STEM short, cylindrico-compressed.

FROND, simple, or divided; margins ciliated, and the surface likewise in aged specimens.

FRUCTIFICATION *dimorphous*^a—tubercles swelling out on the tips of the *cilia*, or nearly sessile on the edge—naked seeds very minute, of the colour of the frond, imbedded in irregular patches.

OBSERVATIONS.

I FOLLOW the example of the respectable Authors of the Dissertation on *Fuci*, Linn. Tr. v. 3. in including several species of different Writers in one; not from conviction, but from inability as yet to discriminate them by Fructification. In the varieties I constitute, I deviate however, in a slight degree, from my Predecessors, and admit none that are not strictly ciliated.^b

VAR. α My first variety described above includes *F. ciliatus* and *holosetaceus*, Gmel. as the broad-leaved sort always at an advanced period, throws out more or fewer soft spines from the surface. Its breadth and bulk is often considerable, as the marginal processes swell to emulate the size of the parent Frond, which are again ciliated at the edges, and those secondary *cilia* continue widening, and are ciliated likewise at the edge.

Var. β frond branched: stem and branches cylindrical; the latter flattening and swelling into a lanceolate acute leaf with a ciliated edge. PL. xv.

This variety is very plentiful in the West of ENGLAND; it grows in thick clusters, frequently as a Parasite on the stems of larger *Fuci*. It is of the size delineated, and is found either of the full red colour of the former broad-leaved kind, or of an olive brown.

Var. γ frond very much branched; branches filiform, compressed, and slightly expanded towards the tip, furnished with very minute *cilia*. PL. xv.

This elegant variety, which nearly approaches *F. corneus*, Pl. xii, was sent me by Mrs. Prideaux BRUNE of PLACE near PADSTOW, with many other curious specimens from the BRISTOL CHANNEL: I have not yet found it in fructification.

Var. δ frond branched: branches linear, acute: *cilia* of equal lengths standing regularly at right angles like the teeth of a comb. PL. xv.

This is the *F. Ptilotus* of GUNNER and ESPER. I found it mixed with my *F. corneus*.

The substance of all these varieties is the same, varying only in a greater or less degree of succulency; the full lake colour of the frond tinges water strongly on maceration, in the same manner as *F. edulis*, and like it is eaten by the Scots and Irish.

ESPER has figured *F. ciliatus* like *F. laceratus* of GMELIN, the fructified branch, n. 3, is unlike any thing I have seen, and has no analogy with this species. He has likewise introduced *F. caulescens* as a Synonym, which is clearly a distinct species.

Hab. VAR. α , common— β , γ , W. of ENGLAND— δ , POLKERRIS, FOWEY, CORNWALL.

^a This is a singular circumstance, and evinces that there are Species nearly allied only discoverable by Fructification under the Microscope.

^b I have reprobated above the inaccuracy of GMELIN in his description of *F. ciliatus* and reference to a Specimen, Pl. xxi. f. 1. with a fringed or slightly crenated edge, which both LIGHTFOOT and WITHERING, notwithstanding his reference, have referred to *F. laciniatus*.

FUCUS CRISPATUS.

TAB. xv.

FUCUS. fronde sub-pellucidâ, glaberrimâ, nitente, aveniâ, laciniatâ; segmentis^a profundè, et irregularitèr incis; angulis rotundis; marginibus elegantèr crispatis. Hudf. 580.
F. laciniatus, VAR. 1. With. 4. 102.—F. laceratus, VAR. 2. Linn. Tr. 3. 155.

^a Frons Act. Linn. et alibi ramosa vocatur.

RADIX

RADIX, callus minutus.

CAULIS o, aut brevissimus, sub-compressus.

FRONS glaberrima, nitens, subrigida; structurâ internâ, è globulis pellucidissimis; cuticulâ, statu recenti, maculis distinctâ; margine elegantè crispato.^b

FRUCTIFICATIO, congeries feminum in substantiâ frondis^c nidulantium. Semina minutissima, rubra, orbicularia.

OBSERVATIONES.

F. crispatum, D. HUDSON, cujus mentio fit suprâ, p. 77. (*F. lacerati*, D. GMELIN, in ACTIS LINNEANIS synonymon,) Tab. xv, icone donavi. "Investigatione sæpiùs repetitâ inducî," ut aiunt, D. D. GOODENOUGH et WOODWARD, "Species plures inter se affines in unum collegere. Fructificatio eadem in omnibus; habitus Frondis diversus." Respectu fructificationis *F. crispati* tubercula nunquam vidi, quamvis iusto tempore, forsan, invenienda forent; sed aliquando cuti adhærentes, sæpe in illâ nedulantes, congeries solummodo feminum cernendæ sunt. Structura frondis interna, ut supra descripsi, Speciem hanc a cæteris discriminabit. Frons statim è basi dilatatur, et quasi palmata fit, latitudine Plantæ altitudinem ejus exsuperante. Frondes plurimæ ex communi disco minutissimo proveniunt; ex segmentis etiam aliquando novi disci fiunt. Portio frondis, recens è mari, Microscopio subiecta sub Sole gemmis contiguis constare videtur. Species hæc edulis est et tinctoria.^d

Hab. in CORNUBIA.

^b Vid. Tab. xv. a. marginis portionem auctam.

^c Vid. Tab. xv. a. aa.

^d Vid. *F. edulis* descriptionem, p. 57.—8.

FRINGED FUCUS.

PL. xv.

FUCUS. frond semi-transparent, very smooth and shining, veinless; lacinated: segments deeply and irregularly cut in; angles circular, margins elegantly fringed.

(No Plate.^a)

ROOT, a minute callous knob.

STEM, o, or very short.^b

FROND, lacquered and shining; rather rigid in texture: its internal structure consisting of pellucid gem-like globules in contact with each other, as it appears when magnified—surface blotched; the edges fringed.

FRUCTIFICATION.—Patches of very minute orbicular seeds imbedded in the surface near the margin.

OBSERVATIONS.

GREAT confusion has arisen among our marine Botanists in arranging some nearly allied Species. The respectable Authors of the Dissertation on *Fuci*, so often referred to, have included this *Hudsonian* Species with three others under *F. laceratus* of GMELIN. They have evidently bestowed great pains upon the subject, but unless a

^a I do not quote GMEL. t. XXI. f. 4; as the Habit of his Plant differs much from ours, and the margin, unless the Engraver has been inaccurate, gives no Idea of the beauty of the fringe of this Species.

^b Properly speaking, *Ulvæ* and all membranaceous Plants have a stem, but it is extremely short.

profusion of Specimens are submitted for examination, as I before observed, examinations into structure and fructification will ever be incomplete. I cannot however aver that the Authors above-mentioned have examined the subject of this article, as this essentially differs from *F. laciniatus* in structure. I have fully described this elegant Structure in the detailed Character.^d This *Fucus* is produced in considerable masses, many shoots proceeding from the same callous knob, and it frequently takes root from the contact of the segments on the rock. It spreads wide, as may be seen in the figure; its breadth often exceeding its height. I have described above its mode of fructification. From similarity of habit, Messrs. GOODENOUGH and WOODWARD have decided that the Species of other Authors are only varieties; but I hope the description and figures given by me of this Species and *F. laceratus* will justify me in keeping them distinct.

Hab. MOUNTSBAY, CORNWALL.

^c See p. 78.

^d The frond of *Ulva umbiculata*, and *lactuca* appear composed internally of globules, when submitted to a high magnifier in the sun.

FUCUS ROSEUS.

TAB. xv.

FUCUS. fronde cylindricâ, tenerâ, solidâ, fursum attenuatâ, ipsâ ramosâ: fructu laterali racemoso.

(Species nova.)

RADIX callus, explanatus?

CAULIS longus, in medio intumescens, fursum gracilis.

RAMULI pauci, irregulares, fursum attenuati.

FRUCTIFICATIO, ut plurimum, in racemum congesta, quandoque bi—vel ternatim disposita, pedunculata: fructus acutus.

OBSERVATIONES.

SPECIES hæc non-descripta est. Fructificatio non nisi hybernis mensibus, ut videtur, conficitur. Substantia tenera, et flexilis; color amœnè rosaceus: superficies glaberrima, annulis ad intervalla, ut sub Microscopio cernere est, instructa; pars tamen interior mucosa, non, ut in genere CONFERVA, tubulosa. Specimen in herbario Societatis LINNEANÆ referendum curabo. Altitudo sexuncialis.

Hab. POLKERRIS juxta FOWEY, CORNUBIÆ oppidum.

FUCUS ROSEUS.

PL. xv.

FUCUS. frond cylindrical, tender, solid, tapering much upwards, branched; branches without order; fructification lateral, or axillary; often in racemes.

(New Species.)

ROOT, a disc flat at bottom?

STEM long, much tapering, and swelling in the middle.

BRANCHES few, irregular, tapering.

FRUCTIFICATION in bunches, generally like *F. subfuscus*.

OBSERVATIONS.

OBSERVATIONS.

THIS Species is a non-descript. I received it from CORNWALL, Nov. 1800, in fruit, as represented in the Engraving. This is one instance among many of the necessity of investigating marine Plants at all times of the year; particularly in the Winter months, as I had often met with specimens of this Plant intermixed with others in the Summer months; but from its straggling habit and general appearance, I always, being out of fruit, took it for *F. sanguineus* after laceration by storms. Its substance is soft, flexible, and tender; the outside smooth; the colour bright pink. On examining it under a glass, the surface appeared to swell as it were into rings; and though from its opacity, and its having a coloured pulpy substance within, I could not discern its inward structure, yet it may have partitions at the swellings. A Specimen of this rare Species is in the possession of the LINNEAN SOCIETY.

Hab. POLKERRIS near FOWEY.

FUCUS DENTATUS.

TAB. xv.

FUCUS. fronde membranaceâ, aveniâ: dentato-pinnatifidâ, ramis linearibus alternis; apicibus truncatis; lacinulis in apice curvatis, acutis. *Herb. Linn.*—*Huds.* 582.—*Lightf.* 952.—*With.* 4. 102.—*Linn. Tr.* 3. 158.

RADIX; callus, minutus.

CAULIS compressus.

RAMI alterni, supra-decompositi, summitatibus truncatis, et acutè dentatis.

FRUCTIFICATIO paniculata, axillaris, fructû terminali, urceolato; feminibus quatuor intus.^a

OBSERVATIONES.

SPECIES hæc in ANGLIÆ Borealis littoribus, et in SCOTIA reperitur: ramificatio elegans et singularis; substantia tenuis, mollis, sub-opaca; habitus crescendi *F. corymbiferi* D. GMELIN. affinis adeo, ut suspicor, eandem esse. Descriptio *F. corymbiferi*, p. 124, atque Icon ejus, GMEL. Fuc. t. x. fig. 1. minimè inter se consentiunt.^b Representatio apicis fructiferi magnitudinis naturalis exhibetur, non, ut oportuit, aucta sub microscopio: vid. tab. x. a, b, c, d. Parvulæ istæ figuræ utrinque prope summitatem d collocatæ, si vitrum adhibeas, paniculam quodammodo representant. Ut ut se res habet respectu *F. corymbiferi*, Specimina tamen, sc. A, fructiferum et B, sterile, tab. xv. accurate delineata, necnon fructificationes partes, prout sub microscopio apparent, *Fucum dentatum* facillimè discriminabunt.

Hab. SCARBOROUGH et in SCOTIA.

^a Vid. Tab. xv. et compara cum *F. subfusco*, Act. Linn. v. 1. p. 131.

^b GMELINI verba hæc sunt: "Fructificatio harum laciniarum in extremitatibus infinitè in denticulos sub-fastigiatos sub-divisis; terminales globuli creberrimi, nigri, opaci, et parenchymatosi femine, Lycoperdi vix majores, decidui. Unde oritur species quædam corymborum minimorum." p. 124. Quid tibi vult Auctor? ane Globulos istos in corymbum dispositos esse?

INDENTED FUCUS.

TAB. xv.

FUCUS. frond membranaceous, veinless; branches alternate, winged-clift; segments forked and truncated, with terminating sharp spinules.

PLATES. ——— *Morif. t. 8. f. 5?*—*Gmelin, F. corymbiferus, t. x. f. 1?*—*Fl. Dan.* 354?

ROOT, a callous knob.

STEM compressed.

BRANCHES doubly pinnatifid, and alternate—summits truncated and acutely dented.

FRUCTIFICATION paniced, axillary; the capsules of the panicle membranaceous, of the shape of the flower of the *Arbutus*; exhibiting to the light 4 seeds in each.

OBSERVATIONS.

THIS is a Northern Species: I have not heard of its having been found S. of SCARBOROUGH. It was gathered by LIGHTFOOT in the FIRTH OF FORTH, and by Mr. M^r. LEAY near JOHN O' GROATS Houfe. It may readily be distinguished from all others by the peculiarity of its habit, described above, and delineated, Pl. xv. The Frond is very thin, tender, and semi-transparent; colour, a dull red: it spreads wide at bottom. MORISON'S figure* does not in my opinion possess that degree of excellence which has been ascribed to it. It resembles *F. dentatus* in the summits only, but has not the size, nor the branching habit of this Species, which much more nearly resembles *F. corymbiferus*, Gmel. This latter indeed is so much like a luxuriant specimen of *F. dentatus*, that nothing but the description of the Professor deters me from inserting it as a Synonym; but it is necessary to add that neither the Description, p. 124, nor the fructified summits, a, b, c, d, Pl. x, are sufficiently perspicuous to establish a Species.† I have been fortunate enough to meet with a fructified branch, which has not been the case with my Predecessors in their Summer Excursions. It is paniced, and something resembling that of *F. subfuscus* described by Mr. WOODWARD. I have accurately delineated it, as it appeared under the Microscope. It is singularly beautiful, and furnishes every requisite for ascertaining this Species.

Hab. North of ENGLAND and SCOTLAND.

* Hist. Ox. iii. t. 8. f. 5.

† The summit a, Pl. x. Gmel. is not magnified, and the globules, if intended for orbicular bodies, as the name imports, are ill represented. There is an error, which all our cryptogamic Writers, the great DILLENIUS not excepted, have laboured under—viz. the omission of magnified Drawings of Structure and Fructification.

FUCUS CONFERVOIDES.

TAB. xv.

FUCUS. fronde cylindricâ, sub-simplici, sub-gelatinosâ: tuberculis inæqualis magnitudinis, co-acervatis per totam Plantam. Linn. Spec. Pl. 1629.—R. Syn. p. 51. n. 53.

RADIX fibrosa.

CAULIS prælongus, extensus, in medio paullulùm inflatus.

RAMULI brevissimi, graciles, sparsi.

FRUCTIFICATIO. Tubercula majora; et minora lateralia, glomerata, mucosa: feminum congerie rubri coloris in medio positâ.

OBSERVATIONES.

F. confervoides, ACT. LINN. v. 3. p. 208. *F. longissimum*, D. Gmelin, *F. flagelliformem*, D. LIGHTFOOT, necnon *F. verrucosum* nostrum, p. 26, amplectitur. Unde autem nomen *Confervoides* apud LINNEUM, nisi ex tuberculis grandioribus ad instar Baccarum in monili collocatis? In *Fuco* tamen *longissimo* tubercula minima

nima sunt, et vix apparentia; item in *F. verrucosus* sparsim collocantur. Mihi persuasissimum est LINNEUM specimen quoddam utpote in Icone representatur penès se habuisse, unde nomen mutuatus est. Auctores supradicti rectè aiunt *Fucos* varios affines sub eodem nomine in *Herbario Linneano* reperiri. Inspectis speciminibus quam multis Speciem hancce sub nomine *F. confervoidis* fisco, *F. longissimum*, GMELINI separatim descripturus. Descriptio RAIJ Syn. p. 51. n. 53. “minùs ramosus, in longum protensus” Speciei huic satis aptè convenit. Statu recenti subgelatinosa est; exsiccata tamen globuli quasi filo trajecto conjuncti apparent. Forma plantæ recentis in Icone exhibetur, nec quicquam addendum videtur, quo a congeneribus distinguatur. Color dilutè purpureus, maturâ ætate pænè evanidus; unde forsan *F. albidus* nomen apud HUDSONUM; descriptio autem ramificationis in Aët. Linn. toto cœlo diversa est.

Hab. in Occidentali ANGLIÆ parte.

FUCUS CONFERVOIDES.

PL. xv.

FUCUS. frond cylindrical, very little branched: sub-gelatinous, with tubercles of different sizes huddled together without order through the whole length of the plant.

ROOT fibrous.

STEM, long, slender, biggest in the middle.

BRANCHES few, short, and small.

FRUCTIFICATION. Tubercles crowded, containing in the middle congeries of blood-red granules.

OBSERVATIONS.

GREAT confusion prevails in this Species and its affinities, which I shall endeavour to clear up by a careful examination of the descriptions and figures of my Predecessors, and of the numerous Specimens I am in possession of. *F. verrucosus* has been already described by me, p. 26, and that has since been referred to *F. longissimus*, GMEL.^a which is a Species so accurately described and delineated by GMELIN, that there can be no doubt entertained about it. The learned Authors, who have made this reference to my *F. verrucosus*, Linn. Tr. 3. 208, have been guilty, I think, of an oversight, for they say that GMELIN'S Plant is distinguished by having “much more numerous and smaller tubercles.” This is certainly a proper distinction between *F. longissimus* and *F. verrucosus*, GMEL. but I think the latter is not an English Species. However, with respect to my *F. verrucosus*, p. 8, the tubercles are very large indeed for the size of the plant; much larger than those of GMELIN'S *F. verrucosus*, Pl. xiv. f. 1. I have no hesitation in applying the trivial name of LINNEUS^b to the Species, which I here present to the Reader, as, when it is dry, with the gelatinous part shrivelled up, it appears to be strung with beads like a necklace, not unlike some of the larger *Confervæ* when shrivelled. A specimen in my possession in this state will be presented to the Society, and there is another fine one in the collection of COL. VELLE. Its habit is very singular; it consists generally of a long stem with weak trailing branches, very short, and more like radicles: “minus ramosus, in longum protensus,” the character of n. 53, R. Syn. p. 51, seems admirably suited to it.

F. longissimus, Gmel. is so accurately described, and the figure, Pl. xiii, so good, that there can be no doubt about that Species. It will form the subject of a succeeding Article.

Hab. on the W. Coast.

^a Linn. Tr. v. 3, under *F. confervoides*.

^b Messrs. WOODWARD and GOODENOUGH say, that in looking into the *Linnean Herbarium*, they find that he considered that *F. confervoides* and *F. albidus* as synonymous: but that is not extraordinary in the state of knowledge of *Fuci* in his time. However there can be no doubt but a warted Specimen presenting the appearance I have described, sent him from some Friend, was the cause of his changing the appropriate name of *F. longissimus*.

FUCUS DIFFUSUS.

TAB. XVI.

FUCUS. fronde filiformi, tubulosâ, ramosâ, in medio turgidulâ, fursùm attenuatâ; septis distinctâ; ramulis tenerioribus diffusis, apice acutis; fructificatione racemosâ. *Huds.* 589.
—*Act. Linn.* 3. 197.—*With.* 4. 112.

RADIX callus, minutus.

CAULIS brevis, opacus.

RAMI diffusi; ramulis tempore fructificationis creberrimis, undique, erumpentibus, tenuissimis, granulatis.

FRUCTIFICATIO in apicibus; axillaris, vel lateralis; formæ variæ;—racemosa, feminibus in apicibus racemorum immerfis;—utriculosa, feminibus per membranam diaphanam intus conspicuis.

OBSERVATIONES.

AUCTORITATE D. D. GOODENOUGH et WOODWARD Speciem hanc inter *Fucos* enumero. Structura interna septis instruitur, cortice tamen opaco obvoluta; et in ramis majoribus tubulus centralis, ut in *F. pinastroidi*, p. 75, frondem totam percurrit. In *Catalectis Botanicis*, D. ALBRECHT WILH. ROTH, Genus novum sub nomine CERAMIUM instituitur, cujus character "Filamenta membranaceo-cartilaginea, sub-geniculata. Capsulæ "sub-monospermæ ad superficiem Frondis sparsæ." p. 33. Huc referendi sunt, ut mihi videtur, Fucus hic et affines Species, *F. F. pinastroides* et *lycopodium*. Fructificationem dimorpham suprà descripsi ac delineavi.^a Magnitudo Plantæ aliquando pedalis vulgò autem sex—vel quadr—uncialis. Habitus fructificandi tempore ramossissimus.^b

Hab. passim.^a Vid. Tab. XVI. a, b, b, b—n, o, o, o.^b Vid. Tab. XVI. d, summitatem fructiferam.

FUCUS DIFFUSUS.

PL. XVI.

FUCUS. frond thread-shaped, tubular, branched: branches geniculated, swelling in the middle, tapering much at the ends, garnished with numerous setaceous branchlets: fructification racemose.

(No Plate.)

ROOT, a small disc.

STEM short, thick, opaque.

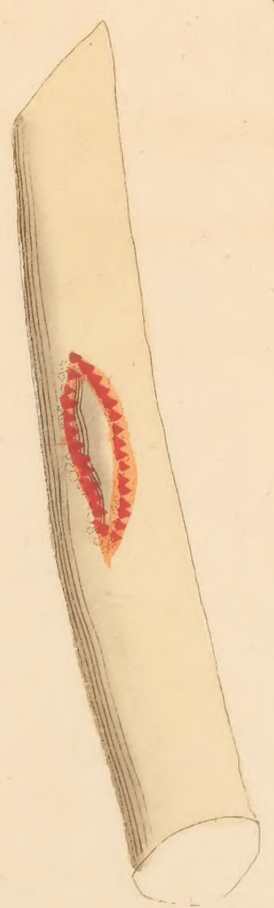
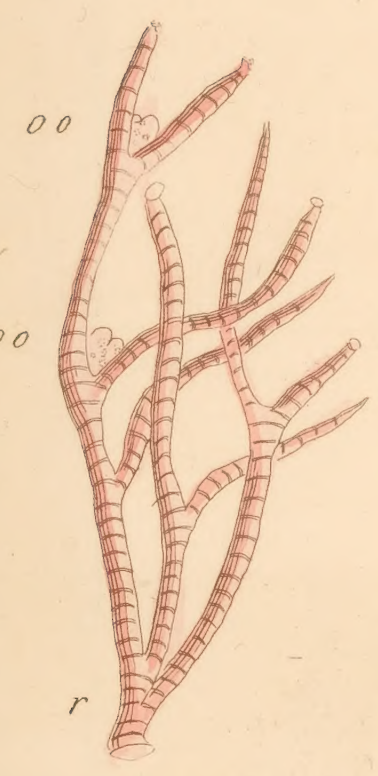
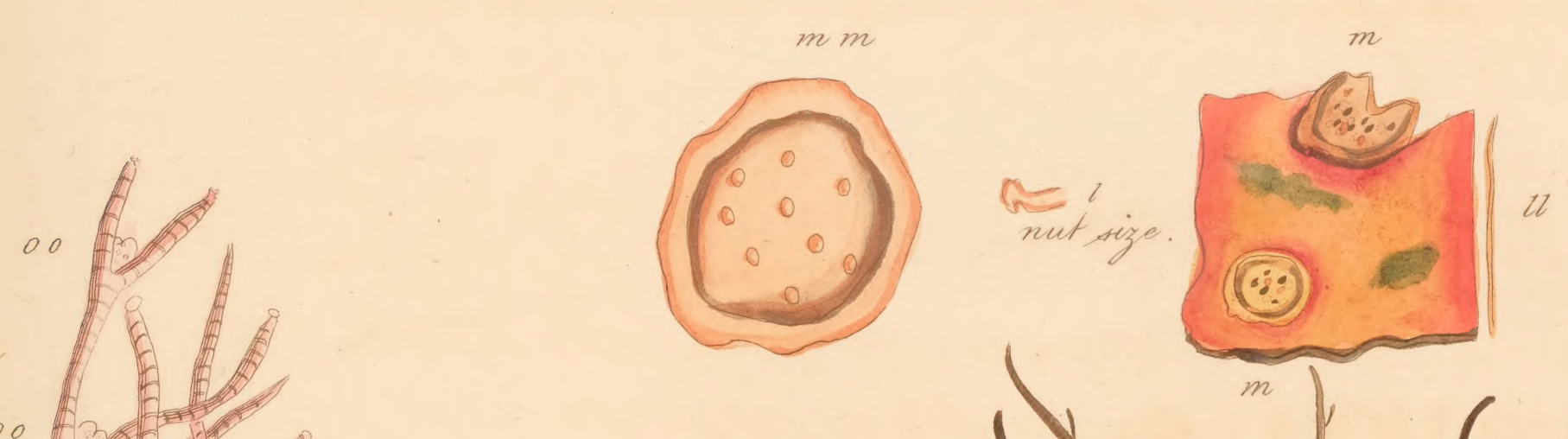
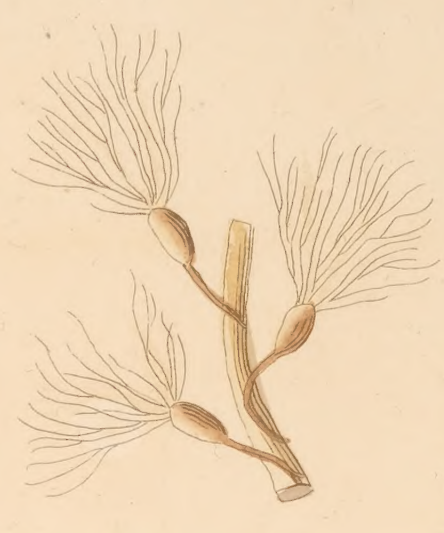
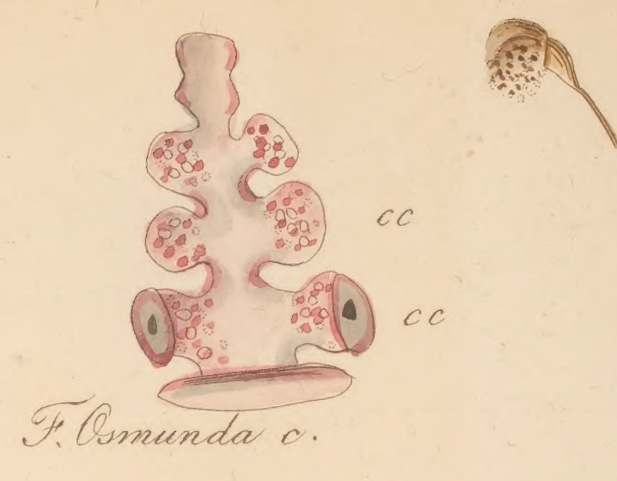
BRANCHES, wide-spreading, ending in setaceous points; * at the time of fruiting crowded with numerous setaceous shoots.

FRUCTIFICATION near the summits, either axillary, or lateral; of different appearances; either forming a Raceme with congeries of imbedded seeds in the summits, or exhibiting transparent axillary Vesicles with the seeds visible through the skin.^b

* This is its usual appearance, as the time of Fructification is in the Winter; see Pl. XVI. d. a fruiting summit. It sometimes fructifies in whorls, as is represented in the lower branch of the figure; and very frequently sends out axillary vesicles, as at o, o, o. fig. n. It occasionally is racemose, as at b, b, b. fig. a. which is drawn from a Specimen sent me by my Friend Mr. PIOTT, being delineated by him under a very high magnifier.

^b See both kinds, Pl. XVI. a, b, b, b—n, o, o, o.

OBSERVATIONES.



OBSERVATIONS.

THIS Species, which has the *Septa* of a *CONFERVA* with the opaque skin of *Genus Fucus*, I place in this Catalogue in deference to the authority of Messrs. GOODENOUGH and WOODWARD. It has been recently classed as a separate *Genus* by ROTH together with *Pinastroides* and *Lycopodium*, and many others with external Fructification.^c I observed under *F. pinastroides*, p. 75, that there was a central capillary tube pervading the stem and branches, which clearly shews there is a difference in the external structure of these opaque Species. The Fructification, which had never been observed by the Gentleman above-mentioned, Linn. Tr. p. 3. p. 197, affords curious matter for speculation, as I have described and delineated it.^d It is of a very firm elastic texture, sometimes nearly a foot in length, but more frequently from four to six inches. It varies at the time of fructifying, as may be seen by the summit, d, Pl. xvi, so as not to be known by those who have not seen it at that season of the year.

Hab. common.

^c This Genus is called *CERAMIMUM*. See ROTH's *Bemerkungen*, p. 33.

^d See Pl. xvi. a, b, b, b—n. o, o, o.

FUCUS LONGISSIMUS.

TAB. xvi.

FUCUS. fronde filiformi, irregularitèr et sparsim ramosâ—ramis inæqualibus distichis: extremis prælongis: fructu minuto laterali orbiculari-depresso. *Gmel.* 134.—*R. Syn.* 51.
n. 53.

F. confervoides. *Linn. Tr.* 3. 208.

F. flagelliformis. *Lightfoot*, 928.

RADIX, callus, minutus.

CAULIS, brevis, statim ramosus.

RAMULI filiformes, irregulares, subsecundi; in medio grandiores; apicibus elongatis; spinulis brevissimis.

FRUCTIFICATIO; globuli minuti, sparsi, laterales; apice depreffi.

OBSERVATIONES.

Fucum longissimum D. GMELIN, ut Speciem fisco, habitu ramificationis ab affinibus diversam. Ramis prælongis, sparsis, quandoque binis ternisve ex eodem latere, instruitur. Species affines, *Act. Linn.* p. 58, 59. *F. confervoides* et *albidus* ex investigatione speciminum in catalogo nostro in tres partiuntur, sc. *confervoidem*, *longissimum*, et *albidum*. Vix quidquam notandum videtur quo Species hæc a *F. confervoidi* suprâ descripto distinguatur. Icon per se, ut mihi videtur, sufficit. In sterilibus speciminibus Plantæ habitus, in fructiferis tuberculorum magnitudo, characteres satis distincti sunt. Magnitudo sexuncialis aut suprâ; color atro-ruber: substantia tenax, externè lubrica et nitens. Varietas aliquando occurrit, si non potius species sit distincta, ramulis prælongis simplicibus ex caule brevi prodeuntibus, flagelli Romani similitudine, *F. flagelliformis* vocatus. D. Professor ESPER. *F. longissimum*, GMEL. tab. xx. adumbravit, habitu tamen ramossimo, fructuque prægrandi, adeo ut species quædam diversa videtur.

Hab. passim.

FUCUS LONGISSIMUS.

PL. XVI.

FUCUS. frond thread-shaped, branched irregular; branches unequal, dichous; the extreme divisions very long and straggling: fructification minute, globular, lateral.

P L A T E S.

Gmel. t. 13.—Esper, Ic. t. xx?

ROOT, a minute callous knob.

STEM short, branching from the bottom.

BRANCHES irregular, sometimes secondary; swelling a little in the middle; garnished with slender short spinules.

FRUCTIFICATION; sometimes on the summits, sometimes in the spinules; consisting of inflations, or confluent tubercles.*

OBSERVATIONS.

THE Authors of the Dissertation on *Fuci* quote this as a Synonym of *F. confervoides* of LINNEUS. I have given my reasons for adopting that name, as the trivial one for the subject of the Article, p. 97, founded on the appearance of the dried Specimen. I here present the Species which is called by GMELIN appositely enough from its singular habit *F. longissimus*, or long trailing Fucus. GMELIN's Tab. XIII, is an excellent Representation, and the Specimen here delineated gathered at PADSTOW will be found to resemble his Pl. XIII perfectly; but the Fructification in some sorts differs. I have no doubt but many nearly allied Species will hereafter be discriminated by fructification. The Authors of the Dissertation on *Fuci* enumerate two different Species nearly allied to each other—*F. confervoides* and *F. albidus*, Linn. Tr. v. 3. n. 58, 59. but as I have arranged *F. longissimus* and *F. confervoides* separately, this Catalogue will consequently include three Species. Their different habits, as presented, Pl. XVI, will be sufficient to distinguish them. The texture of this Species is very tough, and its surface slippery and shining: colour reddish, and semi-transparent. ESPER's Plate xx is much more crowded than I have ever seen it, and as the fructification likewise is larger than I have met with it, I take it to be a distinct Species. I have described the fructification as consisting of inflations: these are like imbedded vesicles.

Hab. PADSTOW, CORNWALL, and elsewhere not uncommon.

* GMELIN says minute lateral Tubercles: this may sometimes be the case; but they are then very minute indeed. There is no appearance of any in his figure of it, Pl. XIII. I have drawn a representation of it under the microscope.

FUCUS GRACILIS.

TAB. XVI.

FUCUS. fronde filiformi, ramosissimâ, confertim prodeunte; fructu laterali, glomerato, minuto juxta apices.

F. albidus, Linn. Transf. non tamen HUDSONI.

RADIX, callus, expansus, plures emittens cauliculos.

CAULIS, brevis; statim ramofus.

RAMULI, numerosi, brevissimi, cylindrici.

FRUCTIFICATIO: tubercula vix visibilia juxta apices cuti adhærentia.

OBSER-

OBSERVATIONES.

F. F. confervoidi et *longissimo* suprà descriptis tertia hæcce accedit Species; quæ quodammodò *F. albedo*, Aët. Linn. v. 3. 210, affinis, mihi tamen ut videtur, diversa est. Suspicio enim Speciem adhuc distinctam, ab Aucto-ribus supradictis juxta WEYMOUTH et CHRISTCHURCH observatam, adhuc sine icone restare. Haud equidem pro certo scio *F. albidum* Dⁿⁱ HUDSON eundem esse, ac *F. albidum*, Aët. Linn. color enim pænè evanidus *F. confervoidis* statu maturo suspicionem mihi injicit HUDSONEM nomen triviale “albidus” exinde *Fuco confervoidi* nostro indidisse; quod si ita sit, habitus iste ramificationis singularis a RAYO notatus, Syn. p. 51. n. 53, quomo- dò sagacitatem Botanici illius adeò celebris effugit non possum non mirari. Altitudo rarò triunciam superat; magnitudo ramulorum fili emporetici minoris: furculi plurimi, usque ad sexaginta, ex basi communi provenientes; color rosaceus, superficies glaberrima et nitens. Fructificatio, ut suprà describitur. Spinulas nullas ad latera ra- morum, ut in *F. longissimo*, cernere est.

Hab. PADSTOW in Com. CORNUBIÆ et alibi.

FUCUS GRACILIS.

PL. XVI.

FUCUS. frond thread-shaped, much branched; sending out numerous shoots from a spreading base, not trailing: fructification, very minute lateral tubercles, near the summits.

(No Plate.)

ROOT, a spreading Disc sending up numerous tufts.

STEM short, branching from the bottom.

BRANCHES, very numerous, short, cylindrical.

FRUCTIFICATION: minute wart-like tubercles, scarcely visible to the naked eye, near the summits.

OBSERVATIONS.

HAVING already described two Species, I now give the third according to the Observations I made under *F. confervoides*; not doubting but some more Species will hereafter be separated from this filiform Family.* It seems to have some affinity with *F. albidus*, Linn. Tr. 3. 210: but there are many points in which it differs, and there- fore I must leave it to future Botanists to ascertain from their visits to WEYMOUTH and CHRISTCHURCH, whe- ther there is not a Species still to be delineated. I hinted under *F. confervoides*, that the pale colour of that Spe- cies, and the size of the warts, may have given the hint to HUDSON for his *F. albidus*; but the striking circum- stance of the ramification is sufficient to discriminate them. The Drawing, Pl. XVI. represents a detached Plant, but the tuft frequently consists of thirty or forty different shoots. Its colour is a bright red, and the size as repre- sented in the figure. The Species is I believe not uncommon; at least it is plentiful on the Coast mentioned be- low, from whence the Specimen delineated was sent to me.

Hab. PADSTOW, CORNWALL, and elsewhere.

* *F. plicatus* and *F. longissimus*, already described and delineated, are affinities; as likewise *F. verrucosus*, p. 26. Pl. VIII.

FUCUS PALMETTA.

TAB. XVI.

FUCUS. fronde aveniâ, membranaceâ, multifido-palmatâ, sub-pellucidâ : fructificatione orbiculari, immersâ.

RADIX, callus plures emittens cauliculos.

CAULIS, nudus, tenuis, sub-compressus ; in folium sese dilatans, vix ramosus.

FOLIA, statim sese dilatantia, extremitatibus subrotundis, in lacinias incis.

FRUCTIFICATIO : scutella concava, seu acetabula, * in fronde immersa ; feminibus rotundis nudis in fundo.

OBSERVATIONES.

SPECIMINA Speciei hujus jamdudum mihi oblata sunt, frequentèr enim in CORNUBIA provenit. Fructificationem nunquam observavi, atque idcirco quid de eâ concludendum foret incertus hæsi. Icon D. GMELIN. t. XXII. n 3, habitu racemoso ^b cum F. nostro parum convenit, tabulatum 23^{ua}, quæ vocatur “ insigni magnitudine,” Hist. Fuc. p. 5, ideo minùs affinitates habet. Prodeunte nuperrimè Dⁿⁱ ESPEr Fasciculo secundo Speciem nostram ibi tab. XL. exacti delineatam inveni. Miratus sum equidem *F. sinuosum*, Act. Linn. v. 3. p. 111. utpote varietatem speciei hujus, tab. XLII, enumerari. Fructificationem, suprâ descriptam ac delineatam D. TURNER acceptam refero. Specimen litera d notatum in Epistolâ nuperrimè mihi mandavit quod, ut sub Microscopio apparet, fig. l. m, m, mm. tab. XVI, representatur.

Hab. in CORNUBIA.

* Vid. Tab. XVI. l. m, m, mm. Fructificatio forsàn ex tuberculis constat in substantiâ frondis immersis, quibus descriptis, cavitatem acetabuliformem, feminibus in fundo, ut in icone representatur, sub microscopio apparere par est conjicere.

^b Suspicio ex descriptione D. GMELIN *F. palmettam* suam, præsertim varietatem majorem, tab. XXIII, exoticam esse.

FUCUS PALMETTA.

PL. XVI.

FUCUS. frond without a nerve, membranaceous ; with an expanded multifid leaf, semi-transparent : fructification orbicular, concave, imbedded.

PLATE.—Esper. Icon. XL.

ROOT, a common Base throwing up many shoots.

STEMS many, naked, simple.

LEAVES, or expansions of the stems obversely conical, rounded at the top, and fringed with numerous lacinia.

FRUCTIFICATION : seeds imbedded in cavities in the surface of the Frond. *

OBSERVATIONS.

I owe the introduction of this new Species to the investigations of my Friend Mr. TURNER, who, on examining a Specimen sent by me as a Variety of *F. membranifolius*, detected the Fructification above described and delineated in Pl. XVI. Previous to my receiving this information, I had seen a Specimen exactly resembling mine : but considerably larger, figured by Professor ESPEr, Pl. XL, and referred to *F. palmetta* of GMELIN. I do not however acquiesce in this Synonym, as GMELIN's Figure, both of the small one Pl. XXII. f. 3, and the very large one XXIII, seem to have a very different habit of growth. I shall however retain this apposite trivial name. It is rather singular that the learned Professor should have figured *F. sinuosus*, Linn. Tr. (*Rubens*, *Ner. Brit.*) as a variety, which is a sinuous mid-ribbed Species.

Hab. on the CORNWALL Coast, frequently on the large stems of *F. digitatus*.

FUCUS

* See Pl. XVI. l. m, m, mm.

FUCUS PALLESCENS.

TAB. XVI.

FUCUS. fronde cylindricâ, solidâ, brevi : minùs ramosâ ; fructificatione oblongâ, scutelliformi ;
margine crispato. *Species nova.*

RADIX, discus, explanatus.

CAULIS, brevis, flexuosus.

RAMULI, pauci, juxta summitates, apicibus truncatis.

FRUCTIFICATIO oblonga, immersa, lateralis, concava : marginibus elevatis feminiferis : feminibus minutissimis orbicularibus.

OBSERVATIONES.

SPECIES hæc, substantiâ gelatinosâ, parasitica, ad summitates *F. lumbricalis* inventa est juxta PADSTOW in CORNUBIA. Fructificatio singularis admodum, et si ita dicam sui generis. Plantæ numerosissimæ in eodem *F. fastigiati* specimine reperiuntur.

Hab. juxta PADSTOW, CORNUBIÆ oppidum.

PALLID FUCUS.

PL. XVI.

FUCUS. frond cylindrical, solid, short, not tapering, and blunt at the edges : few, if any branches, which are near the summit : fructification oblong, immersed like a shield of a Lichen.

ROOT, a flat Disc.

STEM, short, crooked, of an equal thickness.

BRANCHES very few, if any near the Summits; tips crooked, blunted, or truncated.

FRUCTIFICATION singular, consisting of imbedded oblong cavities, with a rough tubercled margin, in which the seeds may be discovered by a microscope which are very minute, orbicular, and dark coloured.

OBSERVATIONS.

THIS non-descript Species was sent me during the last Winter (1801) in a Parcel of Sea Plants from PADSTOW by Mrs. PRIDEAUX BRUNE ; the Lady who so kindly contributed one of the varieties of *F. ciliatus*, p. 92. It is a parasitical plant, and was found covering the summits of a Specimen of *F. lumbricalis*. They were numerous, of a tender gelatinous habit, not more than two or three inches long, perfectly cylindrical, and almost transparent. The fructification, which is described above, and delineated Pl. XVI, a, b, c, distinguishes it from every other, and probably separates it from all the marine *genera* already established.

Hab. PADSTOW.

FUCUS UNDULATUS.

TAB. XVI.

FUCUS. fronde ramosâ ; foliis linearibus, undulatis, pedunculatis ; aliquando, sed rariùs, furcatis ; verticillatim, vel ex adverso positis.

2 F

RADIX,

RADIX, callus, expansus.

CAULIS, subtus, complanatus.

RAMULI, cylindrici.

FRUCTIFICATIO, in medio foliorum sparsim posita: tuberculis internis, feminiferis, papillis externis, foratis, conicis.

OBSERVATIONES.

INTER innumeras *F. vesiculosi* affinitates Speciem hanc, distinctam, ut mihi videtur, fisco. Habitus multis modis diversus est a *Fucis* cæteris fronde coriaceâ, punctatâ. Ramuli superiores, cylindrici, et fursum attenuati. Folia reverâ distincta sunt et pedunculata, non fronde unitâ, ut in affinibus. Margo foliorum elegantèr undulatus, superficies papillis conicis foratis instructa. Icon ramulum solummodò designat. Planta statu maturo altitudinem pedalem attingit ramulis crebris versùs apicem instructa, foliolisque innumeris ejusdem magnitudinis, ac formæ, ut in icone representatur. Fructificatio, etsi *F. vesiculosi* analoga, sparsim tamen in foliolis producitur. Species hæc, utpote ramulis cylindricis donata, undique ramosa est, non in plano, ut *Fuci* cæteri vesiculosi.*

Hab. PADSTOW in CORNUBIA.

* Vid. Tab. XVI. a, sectio transversa folii cum fructificatione; a, a, eadem aucta.

UNDULATED FUCUS.

PL. XVI.

FUCUS. frond branched; leaves linear, undulated at the margin, pedunculate; sometimes, but rarely forked, growing in whorls, or two or more together.

ROOT, an expanded callous knob.

STEM, compressed downwards.

BRANCHES, nearly cylindrical, with distinct leaves on foot-stalks produced on all sides, or in pairs.

FRUCTIFICATION not contiguous; in the middle, or bottom of the leaves,* consisting of internal feminiferous globules, and external perforated *papillæ*.

OBSERVATIONS.

THIS Species is another of the coriaceous *Fuci*, included by Authors under the comprehensive title of *F. vesiculosus*, so often supposed to be found without air-bladders. It is too singular to be any longer confounded with others, as the cylindrical branch, the distinct pedunculated leaves, and the fructification scattered in the bases of the leaves, all which are described above, and which are accurately delineated, are sufficient to establish a specific distinction. A specimen is deposited in the Herbarium of the LINNEAN SOCIETY.——*Hab.* CORNWALL.

* The fructification resembles that of *F. Sherardi*, and it certainly approaches that Species; but its very wrinkled margin, distinct pedunculated leaves, and cylindrical stem, with branches and leaves on all sides, sufficiently discriminate it.

FUCUS OPUNTIA.

TAB. XVI.

FUCUS. fronde cartilagineâ, sub-compressâ, solidâ, concatenatim articulatâ; ramis sub-verticillatis. *Linn. Tr.* 3. 219.

U. articulata, β , *Huds.* 569.

RADIX,

RADIX, fibrosa.

CAULIS, perbrevis.

RAMULI verticillati, ternati, vel dichotomi; ramulis, vel potiùs radiculis minoribus, axillaribus.

FRUCTIFICATIO: tubercula minima, immersa in articulis terminalibus, vel ad axillas.

OBSERVATIONES.

SPECIEM hanc rupibus adnascentem juxta TENBY oppidum in WALLIA AUSTRALI, A. D. 1796, detexi. Specimina a me D. WOODWARD transmissa in Act. Linn. v. 3. p. 219, sub nomine *F. opuntia* descripta, primùm comparuere. DILLENII Tab. 10. f. 9. a, b, c, d, synonyma vocatur, itemque *Ulva articulata*, var. β , HUDSONI affinis certe est Species *F. articulati* nostri, p. 28, et forsan ut junior Planta, vel saltem varietas minor reputanda foret, sed habitus crescendi, articulorum rigiditas, necnon radiculae axillares, characteres satis distinctivi sunt. *F. repentem* Dⁿⁱ. LIGHTFOOT libentèr huc referrem ex nomine inductus, sed aliter censet amicus meus D. WOODWARD, nec ex descriptione nudâ sine speciminibus concludere licet. Icon magnitudinis naturalis plantam ex congerie sumptam exhibet.—*Hab.* in WALLIA.

FUCUS OPUNTIA.

PL. XVI.

FUCUS. frond cartilaginous, somewhat compressed; solid; composed of joints bigger in the middle, and united together chain-like; branches sub-verticillate.

PLATE.—*Dill.* 50. t. 10. f. 9. A. B. C. D.

ROOT, fibrous.

STEM, very short.

BRANCHES, resembling *F. articulatus*, in small whorls of four near the bottom, opposite, axillary, or dichotomous; branches with radicles at the joints.

FRUCTIFICATION: minute, immersed tubercles on the terminal joints, or on separate axillary ones.

OBSERVATIONS.

THIS elegant little Species was first discovered by me at TENBY in S. WALES, and communicated to Mr. WOODWARD, who has described it in the Linnean Transactions, v. 3. p. 219. It is a small, creeping species, growing on perpendicular bare rocks, and forming a thick matted mass. Each joint is quite solid in the middle, in which circumstance it differs from *F. articulatus*, as likewise in not being so tender and gelatinous; and it is also much more compressed. I should incline to think *F. repens* of LIGHTFOOT was this Plant, from his trivial name. I am surprised to observe that the Authors of the Disquisition think it is only a variety of *F. articulatus*. LIGHTFOOT says it is "quite distinct," p. 962. His Description very nearly accords with mine, which is detailed above, but without a Figure it is impossible to decide.* The "acute ligaments, or radicles like claws," by which it affixes itself to a perpendicular Rock, as a Lichen creeps on the bark of a tree, is a very remarkable characteristic.—*Hab.* in WALES.

* Messrs. GOODENOUGH and WOODWARD refer to all DILLENII'S Figures, t. 10. s. 9. but LIGHTFOOT omits A.

FUCUS PLUMOSUS.

Frontisp. Operis.

TAB. XVI.

FUCUS. fronde sub-cartilagineâ, ramossimâ; ramis suprà decompositis, pinnatis; ramulis rectangulis, oppositis; tuberculis globosis, pedunculatis, foliosis. *Herb. Linn.*—*Buddl.* p. 29.—*Lightf.* 935.—*Huds.* 587.—*With.* 4. 120.—*Linn. Tr.* 188.—*Esp.* (pectinatus, *Gunn.*) 97. RADIX,

RADIX, callus, minutissimus.

CAULIS, sub-compressus, opacus.

RAMULI suprâ decompositi; primarii subalterni; secundarii oppositi: pinnulis etiam secundariis, vix visibilibus.

FRUCTIFICATIO: globosa foliosa 4-fariâ dehiscencia per maturitatem.

OBSERVATIONES.

Apèssimè Species hæc "*plumosi*" nomen obtinuit fibrillis ramulorum plumæ fibrarum ad instar ex opposito positis. Frons atro-purpurea; altitudo maxima 4-uncialis. In diversis speciminibus habitus variat; nescio tamen quid sibi vult cl. LINNEUS *F. abrotanifolium*, utpote varietatem *Fuci* hujus enumerans; Hypni ramificationis similitudinem satis aptè tamen innuit. Maxima ramificationis affinitas inter speciem hanc et *Conservam plumosam*. Structura et color quidem characteres discriminantes. *F. plumosus*, D. D. GMELIN et ESPER *Conservæ plumosæ*, ut mihi videtur, referendi sunt; structuram "*subarticulatum*" describit GMELIN, et simile quoddam in ramulo aucto ESPERI, t. XLV. n. 2. apparet. Habitus certè in iconibus amborum *Conservæ plumosæ* non *Fuci* nostri. Ramificatio è contra *F. pectinati*, GUNNERI, ab ipso ESPERO, tab. XLVII, delineata speciem nostram exactè exhibet. Idem innuit Auctor ipse, p. 94. — Hab. passim.

* Affinitas hinc observanda videtur inter *F. plumosum*, *F. pectinatum*, *F. pilotum*, et *F. corneum*, Ner. Brit. non tamen ESPERI.

FEATHERED FUCUS.

Frontispiece.

PL. XVI.

FUCUS. frond sub-cartilaginous, much branched; doubly pinnatifid: branches opposite, and at right angles. Tubercles of fructification globose, pedunculate, leafy.

PLATES.—Ray's Syn. Pl. 2. Flor. Dan. 350.

ROOT, a very minute callous knob.

STEM, somewhat compressed, opaque.

BRANCHES: principal ones alternate; secondary ones opposite, short, nearly of a length, set at right angles like the teeth of a comb; these latter spinules likewise appearing when magnified to be garnished with bristles.

FRUCTIFICATION: globular, set round with leafy appendages like a calyx, bursting as it were in valves.

OBSERVATIONS.

If elegance of ramification is admitted as a criterion, this is one of the most beautiful of the Genus. Its colour however, unless held to the light, is dull, and it does not vary its tints like *F. coccineus*. This is by no means a common *Fucus*, and Professor GMELIN, and since his time Professor ESPER, have mistaken specimens of *Conserva plumosa* for this Species.* Its general appearance is in dense masses difficult to disentangle. The publication of Professor ESPER's work enables me to decide that *F. pectinatus* of GUNNER is a near affinity, if not the same as ours, differing a little in colour. Indeed the learned Author has himself observed it p. 94.

Hab. common.

* I cannot assert this of ESPER's Species, which he says is often more than a foot long. p. 95.

FUCUS COCCINEUS.

Frontisp. Operis.

TAB. XVI.

FUCUS. fronde compressâ, sub-cartilagineâ, ramosissimâ; ramulis triplicato-alternis: fructificatione polymorphâ. Herb. Buddl. 29.—Petiv. 26.—Gmel. (Plocamium.) 153.—Lightf. 957.—Huds. 587.—With. 4. 119.—Linn. Tr. 3. 187.

RADIX,

RADIX, fibrosa, furculis numerosis.

CAULIS, sub-compressus, cartilagineus.

RAMI, sub-alterni, incurvi; ramulis serie ternatâ alternantibus.

FRUCTIFICATIO varia—tubercula adnata, globosa, atro rubentia—filiquæ, vel capsulæ sub-ternæ, pediculo conico insistentes.—Racemi filiquarum ex axillis prodeuntes.^a

OBSERVATIONES.

RAMULORUM dispositione singulari a congeneribus facillè distinguitur Species hæc in littoribus nostris ubique occurrens. Habitus, ut suprà describitur, sc. duo, vel tres ramuli ex uno ramorum latere, dein duo vel tres ex altero latere. Ex eâdem radice plurimi nascuntur cauliculi, apicibus ramosissimis, et inter se implicatis unde nomen (LIGHTFOOT, et GMEL.) *plocamium*. Nulla in *Syst. Naturæ* Speciei hujus mentio. Fructificatio, ut suprà, describitur.^b Color amœnè rosaceus. Tria in ESPERO delineantur Specimina coloris varietate plus æquo luxuriantia, habituque ramificationis absimilia.—*Hab.* passim.

^a Vid. Tab. in Frontispicio Operis, a, b, c, d.

^b Vid. quæ notavi in Præfatione, p. xxvi.

SCARLET FUCUS. *Frontispiece.* PL. xvi.

FUCUS. frond compressed, somewhat cartilaginous, much branched; branches alternating in a series of three; fructification polymorphous.

PLATES.

Gmel. xvi. f. 1.—*Esp.* Ic. ii.

ROOT, fibrous, with numerous shoots at bottom.

STEM, sub-compressed, cartilaginous.

BRANCHES, alternate, crooked: branchlets in series of three, on each side alternately.

FRUCTIFICATION of different shapes—large, round, dark-red adnate tubercles.—Pointed capsules or fruit-vessels of 2 or 3 together, on conical footstalks.—Bunches of fruit-vessels in no regular order.

OBSERVATIONS.

THIS is the most plentiful of the smaller kinds on our Coasts, and its ramification is singularly beautiful. It is found of different colours, and occasionally is variegated, but not so much as it is represented in ESPER's Icons. It forms very thick masses, and is sportive in its habit; but the ternate alternation is always to be found on some part of the plant. The impression in the Frontispiece will convey a better idea than can be done by words. I have described the Fructification above, and delineated it. Professor ESPER thinks the ternate capsule, a young shoot; but Mr. PICOTT, with a microscope of high powers, detected 2 rows of granules in each capsule; and he has at times seen these capsules after the discharge of the seed lose their colour, and become yellow. Drawings a, b, c, d, e, represent the fructification. See my Observations in the Preface, p. xxvi.

Hab. every Part of our Coast.

FUCUS LYCOPODIUM. TAB. xvii.

FUCUS. frondi filiformi, tubulosâ, ramosâ; ramis undique foliolis squarrosis densissimè coopertis. *Linn. Syst. Nat.* 717.—*Retz Flor. Scandinav.* 1696.—*F. Lycopodioides. L.*

Tr. 3. 223.—*FL. DANICA*,—*Conferva squarrosa.*

RADIX, callus, minutus.

CAULIS, internè nudus, ad basim contractus.

RAMI, pauci, obtusi, ramulis hinc inde, *Lycopodii* ad instar, brevibus, obtusis.

FRUCTIFICATIO incognita.

OBSERVATIONES.

SPECIES rarissima, nec adhuc in ANGLIA, quoad scio, nisi YARMUTHI reperta. Frons sexuncialis et ultra, filiformis, crassitie pennæ corvinæ, radicem versus nuda, foliolis brevissimis filiformibus, obtusis, rigidis, undique imbricata. Substantia dura, lignosa, et ad *Fucum Pinastroïdem* proximè accedens, cujus certè affinis Species est. Specimen penès amicissimum D. WOODWARD, unde Icon delineatur, nuperrimè vidi. Incola profundi maris, ut suspicor, inter rejectamenta maris semel atque iterum reperta est.——*Hab.* in NORFOLCIA.

MARINE LYCOPODIUM.

PL. XVII.

FUCUS. frond thread-shaped, tubular, branched; branches thickly covered or imbricated with short subulate leaflets, rigid, obtuse.

PLATE.—*Fl. Danica. Pl.* 357.

ROOT, a minute callous knob.

STEM naked below, and contracted near the base.

BRANCHES, few, obtuse; garnished sparingly with short obtuse shoots, as in GENUS *Lycopodium*.

FRUCTIFICATION undiscovered, but most probably resembling that of *F. pinastroïdes*.^a

OBSERVATIONS.

I HERE present a very rare Species, which has not been found above two or three times on the British Coast, and then among the wreck of Plants after blowing weather. To those who are acquainted with the imbricated trailing moss, which creeps among the Heath in mountainous places, and which is called by Botanists *Lycopodium*, no farther description is necessary; and without that knowledge, the singularity of its habit, as it is accurately delineated in the Plate, will be a sufficient mark of discrimination. Height and size, as represented Pl. XVII. I have slightly altered the trivial name.——*Hab.* YARMOUTH, thrown ashore on the Beach.

^a See my Remarks, p. 74. It is fair to judge from structure and habit, that the three species described in this work, *Pinastroïdes*, *Diffusus*, and *Lycopodium*, have similar fructifications, and should constitute a separate Genus. They will arrange under Genus CERAMIMUM of ROTH. See Pref. p. XXXI.

FUCUS DISCORS.

TAB. XVII.

FUCUS. fronde sub-tereti, ramosâ; foliis pinnatis, lineari-lanceolatis, laciniatis; apicibus acutis, furcatis; fructu racemoso terminali.

RADIX, callus, ex caule intumescens.

CAULIS, validus, sub-compressus, ramentis, five aculeis inermibus vestitus.

RAMI fursùm attenuati; foliis, vel alternis, vel oppositis, nervo intermedio; papillis foratis in superficie, aliquando convolutis, et sub-cylindricis.

FRUCTIFICATIO racemosa, terminalis; fructû mucofo, obovato; papillis foratis extûs.^a

^a Vid. Tab. XVII, a, nat. mag.—a, a, auct.—b; b, b, papillas.

OBSER-



OBSERVATIONES.

SPECIES hæc utpote BRITANNIÆ indigena, nunc primum recensetur. A LINNEO satis apto nomine *F. discors* nominatur; in diversis enim speciminibus, et diverso anni tempore nihil unquam “tam dispar sibi.” Plantam sterilem, si modo sit Species eadem, delineavit D. ESPER. tab. XXVI. Foliis lanceolatis acutis, aliquando furcatis, sæpius laciniatis, nec non acutè ferratis instruitur, et haud rarò folia hæc convoluta, et quasi cylindrica cernuntur.^b

Hab. in INSULA VECTI, et juxta SIDMOUTH in DEVONIA.

^b Vid. Obs. in *F. fibroso*, p. 81.

FUCUS DISCORS.

PL. XVII.

FUCUS. frond cylindrico-compressed: leaves pinnate, lanceolate, with lateral *laciniæ*, acute-pointed, sometimes forked. Fruit in racemose spikes, terminating the principal branches.

PLATE.—*Esp. Ic. Pl.* XXVI.

ROOT, a callous swelling out from the bottom of the stem.

STEM short, the bottom of the stem thick, solid, covered with sub-conical, or obtuse appendages.

BRANCHES long, tapering, garnished with alternate leaves of the peculiar shape described as above; having a midrib, with sharp summits, and perforated *papillæ* on each side, bifid, sometimes rolled in, and cylindrical, punctured and midribbed.

FRUCTIFICATION terminating the branches; consisting of a branching spike of mucous ovate acute fruit.

OBSERVATIONS.

THIS Species is for the first time introduced into the British Catalogue. I gathered it in the year 1797 at SIDMOUTH, and sent it as a non-descript to Mr. WOODWARD, who imagined it to be a variety of *F. feniculaceus*. These specimens had the leaves rolled in,^a and had few, if any fructifying tubercles. I sent afterwards some to Mr. TURNER, who ascertained them from inspection of the *Linnean Herbarium* to belong to *F. discors*, Linn. Professor ESPER has lately figured *F. discors* of LINNEUS, from a specimen collected on the coast of ITALY: it differs in several respects, at least it is not a fruited specimen. He compares the covering of the large branches to coarse Felt,^b which is different from ours; but the peculiar shape of the leaves, and the whole habit, make me think they are the same species. Nothing is said by Professor ESPER of its racemose fructification, which is figured Pl. XVII. a, nat. size. a, a, magnified.—Hab. HAMPSHIRE, and DEVONSHIRE Coasts.

^a This property which I have noted before under *F. fibrosus*, p. 81, is more remarkable in this Species than in any other, and may cause them to be mistaken for different species. Notwithstanding the breadth of these leaves in the Figure Pl. XVII, I have seen them sometimes quite cylindrical. This takes place at different seasons of the year.

^b “Die Aeste in form eines dichten Filtz umgeben.” *Esp. Ic.* p. 59. In the microscope, however, the appearance is of conical flat-headed appendages. See Pl. XVII. h. i, i, i.

FUCUS COSTATUS.

TAB. XVII.

FUCUS. fronde membranaceâ, diaphanâ: ramis angustis, linearibus, costatis. Fructû tubuloso, terminali.

RADIX

RADIX incognita.

CAULIS, brevis, alatus.

RAMULI, alati; costâ centrali; membranâ angustâ, in utroque latere tenuissimâ, pellucidâ.

FRUCTIFICATIO, ob-ovata, utriculosa, foraminulis extûs; seminibus intûs per membranam ad lucem conspicuis.*

OBSERVATIONES.

SPECIES non descripta, et, ut opinor, rarissima. Substantia, tenuitate et structurâ, quam maximè *Generi ULVÆ* affinis. Membrana alæ, ut par est conjicere ex habitu fructificationis, duplex est, firmitèr tamen cohærens, ut in *Ulvâ compressâ*.—*Hab.* juxta FOWEY, CORNUBIÆ oppidum.

* Vid. Tab. xvii, c; d, d, summitat. auct.

FUCUS COSTATUS.

PL. xvii.

FUCUS. frond membranaceous, transparent; branches very narrow, linear, midribbed; fructification vesicular, transparent.

(No Plate.)

ROOT unknown.

STEM, short, winged.

BRANCHES winged with a transparent *alvaceous* membrane on each side.

FRUCTIFICATION obovate, vesicular; with external perforations through the skin and congeries of seeds on the inside.

OBSERVATIONS.

THIS is an entirely new Species bordering on *ULVA*; but from its being midribbed, and having terminal fructifications, it is arranged by me in this Catalogue of *Fuci*. I had the specimen from whence the Drawing is taken, and which is presented to the LINNEAN SOCIETY, from Mr. W. RASHLEIGH, who gathered it near FOWEY in CORNWALL. I conjecture from the tubular nature of the fructification,* that the lateral wings consist of a double membrane closely adhering together, as is the case with *Ulvâ compressâ*. It is I imagine very rare.

Hab. FOWEY, CORNWALL.

* See Pl. xvii. c. d, d, d.

FUCUS PEDUNCULATUS.

TAB. xvii.

FUCUS. fronde tubulosâ, filiformi, pinnato-ramosâ; ramis setaceis, simplicibus; tuberculis oblongis, pedunculatis, undique erumpentibus. *Huds.* 587.—*Linn. Tr.* 3. 213.—*With.* 4. 120.

RADIX, callus, minutus?

CAULIS, tubulosus, setaceus, cylindricus, flexilis.

RAMI, prælongi, simplicissimi, versûs apicem breviores.

FRUC-

FRUCTIFICATIO: longis pediculis infistens; primò ovata, filis tenuissimis, ex apice provenientes; deinde feminibus malsâ lanosâ circa stylum persistens * involutis.

OBSERVATIONES.

Fucus hic habitû singulari a cæteris facillimè discriminandus est. Radix adhuc incognita, si tamen GMELINI synonymon admittatur, "Styrps disco rupi adfixa est." Fructificatio singularis admodum totam plantam operit. Hujus nulla mentio in Act. Linn. excepto quod "tubercula pedunculata" vocantur. GMELINI verba in *F. Gærtnerâ* describendo apprimè designant fructum *Fuci* hujus in statu primo—"Fructificationes . . . erectæ, hyp-
"ni antheram gracilem referentes, inferiùs pedunculatæ, apice in penicillum laxum, subviridem, fluitantem, facil-
"limè deciduum, efflorescentes." Gmel. Fuc. p. 164. Descriptio sanè apud GMELINUM ordinis, ramulorum et fructificationis, trifariam alterni, minimè cum *Fuco* nostro convenit, ideoque statuendum est species duas fructi-
ficatione affines, habitu tamen diversas, apud nos, et in exteris regionibus occurrere.

Hab. WEYMOUTH et YARMOUTH.

* Vid. Fructificationem hancce valdè singularem. Tab. xvii. i, i; k, k.

b In speciminibus nostris penicilli filamentosi ad summities ramulorum conspiciuntur, qui structurâ geniculatâ generi *CONFERVÆ* proximè ascedunt; etsi forsan fructificationis partes sint.

PEDUNCULATED FUCUS.

PL. xvii.

FUCUS. frond tubular, thread-shaped; pinnato-racemose; * branches bristle-shaped, simple: tubercles on long slender footstalks.—No Plate.

ROOT, a minute disc?

STEM, very slender, bristle-shaped, cylindrical, flexible.

BRANCHES distant, gradually shortening towards the summit of the Plant.

FRUCTIFICATION on long footstalks: consisting in the first stage of an ovate tubercle, crowned with a thick tuft of very fine threads seemingly jointed: b in the second, of woolly masses of seeds, surrounding a long persistent style. c

OBSERVATIONS.

THIS elegant Species is readily discriminated from every other by its habit, even when not loaded with its fructifying tubercles, which is the usual state in which it is found. Its root is supposed to be discoid. It is difficult to meet with it perfect, as the substance is very tender. Messrs. GOODENOUGH and WOODWARD have noticed green filamentous tufts at the edges of the branches, which they suppose to be a parasitical *Conferva*; and from hence they suppose this to be *F. Gærtnera* of GMELIN; but the tufts in GMELIN's description are on the summits of the fructification. The fructification is described by them simply as "pedunculate tubercles;" from whence it is easy to infer that it was never examined under a microscope. I incline to think *F. Gærtnera* an affinity, but not the same from the remarkable habit described by GMELIN, which ought not to have escaped the observation of the Gentlemen above-mentioned. The Professor's words, in describing *F. Gærtnera*, are "—— the fructification is on the branches, in a sort of alternation by three and three, erect, resembling the slender *anthera* of a *HYPNUM*, standing on a footstalk crowned with a lax, floating, greenish pencil of fibres quickly falling off." Gmel. Fuc. p. 164. This species is a native of deep waters, and only found cast on the beach.—Hab. WEYMOUTH and YARMOUTH.

* Linn. Tranf. 3. 213. This is literally translated; but the plant is properly pinnate, having no secondary branches; but the *pinnæ* are lax and distant.

b The threads are so fine, that a Pillar Microscope does not shew them larger than human hairs.

c See Tab. xvii. i, i; k, k. These were drawn from 2 specimens of different maturity: in the latter state, the woolly mass seemed to form spiral capsules; in some plants however, which were perfect on cutting them transversely, orbicular seeds were seen to issue out.

FUCUS VIRIDIS.

TAB. xvii.

FUCUS. fronde tereti, tubulosâ, ramosissimâ; ramis oppositis; ramulis æqualibus, capillaceis, diaphanis; setis mollibus, tenuissimis.

2 H

RADIX ; callus, opacus, nigro-olivaceus.

CAULIS, cylindricus, tubulosus, fili emporetici magnitudine, coloris luteo-viridis.

RAMI, oppositi, prælongi, vel inæquales.

RAMULI, æquales, tenuissimi, densissimi ; spinulis oppositis, ramulis adhærentibus, obsoleti.

FRUCTIFICATIO : vesiculæ ovatæ, in summis apicibus.

OBSERVATIONES.

SPECIEM hanc, sub nomine triviali *F. viridis* in FLORA DANICA descriptam, in littore Orientali propè YARMOUTH oppidum detexit nuperrimè amicissimus nostri D. TURNER, specimenque, cujus icon, Tab. xv, expressa est, mihi mandavit. Habitus totius frondis capillaceus, et sub aquâ amœnissimè fluitans. Altitudo quandoque pedalis. Color variat respectu ætatis : in junioribus luteo-viridis, ad lucem mutabilis ; in adultioribus subsuscus, sed tamen diaphanus. In apicibus maturis tubulus, ut videtur, longitudinalis conspicitur, qui, tunc temporis solummodo contractione visibilis, totam frondem, ut conjicere par est, pervadit, pelluciditate tamen inconspicuus.* Fructificatio in apicibus conficitur. Vesiculæ ovatæ, terminales, maturâ ætate cernuntur (vid. b.); femina tamen parvitate suâ minimè visibilia sunt. In apicibus quibusdam casu aliquo abruptis, aut vesiculis seminalibus deciduis, fila alba, tenuissima conspiciuntur, fructificationi, ut videtur, inservientia. Plurimum adjuvabit in re tam subtili Microscopii Solaris dextera accommodatio.^b——Hab. YARMOUTH, in NORFOLCIA.

* Microscopio Solari nuperrimè in floribus Filicum detegendis felicissimè usus est Jos. Fran. MARATTIUS. Vid. opus ejus rarissimum GOTTINGÆ apud SCHÖDER. 1798.

^b Minimè certus sum an tubulus ille solummodo idealis sit, et ex collapsu cuticulæ proveniens. Suspicio tamen structuram aliquam internam reverà existere, septis diaphanis, ut suprà in *F. filo* annotavi, p. 41.

FUCUS VIRIDIS.

PL. XVII.

FUCUS. frond cylindrical, tubular, very much branched ; branches opposite ; branchlets of an equal length, capillary, transparent, garnished with very slender soft spines.

PLATE. *Flor. Dan.*

ROOT, a thick opaque callous knob.

STEM, the size of small packthread ; colour, apple green, when young.

BRANCHES opposite, very long ; the opposite ones unequal in length.

BRANCHLETS of an equal length, very slender, and much crowded ; garnished with fine short, soft spinules, fitting close to the stem.

FRUCTIFICATION terminal ; consisting of oval vesicles, but with no visible seeds within.

OBSERVATIONS.

WE owe the discovery of this elegant Species, figured in FLORA DANICA, to Mr. TURNER, who sent me the specimen from whence the Drawing was taken, together with some others more advanced, from the Beach of YARMOUTH. It has the capillary, floating habit of the most delicate *Conservæ*, but no internal *septa* are discoverable by the microscope, though I suspect their existence. All tubular plants require some internal organization, to prevent their collapsing, as I formerly observed on *F. filum*, p. 41. I have hopes that the powers of the Solar Microscope may hereafter be applied in detecting the Theory of Fructification in these marine species, where the parts are too minute to be investigated by the compound in its present state.* No further description is necessary to identify this species, which, as will appear by the inspection of the Plate, differs so remarkably in colour and habit from every other. Its fructification is described above, and is delineated in the Plate : there are terminal vesicles, but the seeds are not conspicuous with a Pillar microscope ; and in some summits, which appear broken off, there are pencils of whitish fibres, which probably have some connexion with Fructification.^b

Hab. YARMOUTH.

* See Note b above.

^b See Pl. xvii. a nat. size. a, a, magnified. b a vesicle magnified. c a summit with the tufts of fibres.

AN APPENDIX,

Containing Species recently delineated, which on that account are not engraved in this Work, arranged alphabetically.

F. ASPARAGOIDES. Fronde filiformi, ramossimâ; tuberculis globosis pedunculatis; ramulis fetaceis, fubulatis, alternis respectu tuberculorum. *Linn. Tr. 2. 29.—With. 4. 117.*

OBSERVATIONS. This Species was first discovered by Mr. WIGG, and described and delineated by Mr. WOODWARD in the *Linn. Tr.* The Root is fibrous; frond thread-shaped; cylindrical; branches of the size of small pack-thread; garnished with short, sharp, soft spinules in a sub-alternate order, with pedunculate round seed-vessels placed alternately between the spinules, of about half their length. Height 6 inches; colour pink, or bright red, though subject to variations. This species is not peculiar to the Norfolk Coast: it is to be met with in Devonshire and Cornwall. Height 3 or 4 inches.—*Hab.* YARMOUTH and CORNWALL.

* This reference to Sheets has respect to Drawings, to be furnished by Mr. WHITE, the Publisher, from originals of mine, to those who are not in possession of the Linnean Transactions, the works of LIGHTFOOT, and VELLE, where these Species have been recently delineated, or who wish to have the work complete.

F. BIFIDUS. Fronde membranaceâ, dilatâtâ, bifidâ: segmentis divaricatis obtusis; tuberculis marginalibus, distantibus. *Hudf. 581.—With. 4. 103.—L. Tr. 3. 159.*

OBSERVATIONS. Root fibrous, frond bifid, divaricating, very thin, and transparent. This species grows in matted clusters, and is strictly dichotomous, * though in appearance irregular, the dichotomy is often repeated 4 or 5 times. Fructification very particular; consisting of small tubercles partly immersed in the margin of the frond, but prominent, large, orbicular, and distant. Height from $\frac{1}{2}$ inch to 2 inches, or more: colour purple red.—*Hab.* common.

* Though this appears to be its general habit, yet I have found it remarkably sportive in its shape, if it in fact is not a small one of a different Species. See a specimen so marked in the Book presented to the Society.

F. CANALICULATUS. Fronde dichotomâ, integerrimâ, suprâ convexâ, subtus concavâ, lineari: tuberculis feminiferis fructu bifido, vel irregulari, inclusis. *Herb. Linn.—Syst. Nat. 812.—Gmel. 73.—Morif. 647.—Hudf. 583.—With. 4. 99.—Linn. Tr. 3. 172.*

OBSERVATIONS. This Species is distinguished from others by a channel or furrow passing longitudinally along the under part of every branch, or more properly speaking, it is convex above, concave below. Its root is a coriaceous disc, which sends up many shoots, which branch in a dichotomous order and are terminated, when in fruit, with swollen tubercled summits of a yellowish colour. It is generally diminutive, and grows sometimes much above low water mark; but is greatly affected by situation, so as occasionally to emulate the larger *Fuci*. Its frond is punctured with one or two series of urceolate vessels, in the upper segments discernible by an eye-glass, and with a strong light even without that assistance.—*Hab.* common.

F. DASYPHYLLUS. Fronde tereti, ramosâ; ramis filiformibus, sub-simplicibus: foliis cylindricis obtusis, basi, attenuatis sparsis. *L. Tr. 2. 239. 3. 119.—Eng. Bot. 847.—With. 4. 112.*

OBSERVATIONS. Root callous: frond tender, transparent, cylindrical; branches, a few long ones from the root: branchlets, or leaves, few, irregular; some of them simple, others branched again, or lacinated; smaller at the point of insertion. The whole Plant tender and succulent. Fructification minute sessile tubercles, without order, adhering to the coats of the principal branches, generally near the summits.*—*Hab.* YARMOUTH, and elsewhere.

* The structure of this Species, according to my Friend Mr. PICOTT, is curious; consisting of a net-work of diagonal lines crossing each other.

F. ENDIVIAEFOLIUS. Fronde membranaceâ, laciniatâ; laciniis dilatatis, undulatis; marginibus crispis tuberculatis, punctatis. *Lightf. 948.—Linn. Tr. (F. laceratus.) 3. 155.—With. 4. 103.*

OBSERVATIONS. Root, a minute callous knob, throwing out shoots, which immediately expand into a thin membranaceous substance, variously divided into deep undulating segments. It has its edges wavy and crumpled. Fructification, compressed circular tubercles near the edge on the surface of the frond. Messrs. GOODENOUGH and WOODWARD have classed this as *F. laceratus* of GMELIN, but its habit is totally different. LIGHTFOOT's Plate is not very characteristic of this Species, though his Description is good. The Drawing above referred to is from an Irish Specimen. Instead of classing the Affinities of this Species as Varieties, after the example of Messrs. GOODENOUGH and WOODWARD, I have already engraved, in addition to the subject of this Article, *F. laceratus* and *F. crispatus* as separate species, and doubt not but 2 or 3 more will be hereafter discriminated from more accurate investigation.—*Hab.* SCOTLAND and IRELAND.

A P P E N D I X.

F. ESCULENTUS.
Lightf. Flor. Scot.
v. 2. t. 28.
Sheet B.

Fronde simpliciter ensiformi; stirpe infra sub-tereti; stipite denso, compresso, folium percurrente. *Linn. Syst.* 815.—*Mantiff.* 135.—*Gmel.* (F. fimbriatus.) 200.—*Gunn.* 4.—*Fl. Dan. t.* 417.—*Linn. Tr.* 3. 140. (F. teres and tetragonus.)—*Lightf.* 948.—*With.* 4. 93.

OBSERVATIONS. Root fibrous; stem round at bottom, compressed in the midrib, garnished just below the leaf with a tuft of leaflets, succulent in the middle, pedunculate, and fringed at the edges. Leaf membranaceous, veinless, plaited near the midrib, very long, lessening upwards, and always near the extremity in a state of laceration. Midrib thick, and compressed, running the whole length. **LIGHTFOOT'S** Plate is very much diminished: the Drawing accompanying this Description is only of a small sized Specimen. Messrs. **GOODENOUGH** and **WOODWARD** have divided this Species into two; but I think it has been owing to a mistake; as the character of *F. teres* is taken from the lower part of the stem, which is cylindrical; and that of *F. tetragonus* from the continuation of the Stem as a midrib, when its thickness is compressed so as to become almost quadrangular. The membrane is veinless, transparent as that of *Ulva*, and of a beautiful clear brown; its greatest size 4 feet by 9 inches.

Hab. SCOTLAND, IRELAND, the W. extremity of ENGLAND in deep waters.

F. FRUTICULOSUS.
Sheet F. n. 3.

Fronde ramosissimâ: ramis cylindricis, flexuosis; ramulis brevissimis ad apices fasciculatis.

OBSERVATIONS. I mentioned this *Fucus* in my Preface, as being recently about to make its appearance in the *Linnean Transactions*. It is admirably figured in **JACQUIN'S** *Collectanea*. The delineation referred to above, is accurate as far as the Specimen authorized me to exhibit it; but it is a barren Specimen.—*Hab.* ACTON CASTLE, MOUNTS-BAY, CORNWALL.

F. GIGARTINUS.
Linn. Tr. v. 3. t. 17.
Sheet C. n. 4.

Fronde cartilagineâ, dichotomâ, ramosâ; ramis æqualibus, acutis, spinoso-dentatis; tuberculis lateralibus, globosis. *Herb. Linn.*—*Murray. Syst. Veg.*—*Linn. Tr.* 3. 183.—*With.* 4. 111.

OBSERVATIONS. Root an expanded Disc, sending out many shoots. Frond cylindrico-compressed, naked at bottom, branching upwards, rigid, semi-pellucid. Branches irregular, sometimes alternate, at others sub-dichotomous, tapering upwards: dividing so as to form right, or obtuse angles with the stem. Fructification, minute globules, generally sessile, towards the extremities. This Species has been recently detected among some Specimens sent by me to Mr. **TURNER**, from one of which the Drawing C. n. 4. was taken. It has the texture of *F. crispus*, and may be taken for a Variety of the *mammillose* kind.

Hab. CORNWALL, St. IVES.

F. HYPOGLOSSUM.
L. Tr. v. 2.
Pl. VII.
Sheet A. n. 3.

Fronde ramosâ, alatâ; foliis lineari-lanceolatis, planis, integerrimis, proliferis. *Linn. Tr.* 2. 30. 3. 113.—*Herb. Bankf.* (F. hypoglossum et F. lingulatus.)—*With.* 4. 95.

OBSERVATIONS. This elegant Species differs from *F. alatus* and *sinuosus* in habit. Its root is a minute Disc. Frond membranaceous, very delicate, transparent, of a pinky colour. Leaves lanceolate, sessile, midribbed; Midrib proliferous, having numerous small leaflets. Fructification of 2 kinds; either globular tubercles of a deep red colour, fixed in the midrib, or minute imbedded punctures placed in regular rows. See my Observations on this *dimorphous* Fructification, Pref. p. xxvi.—*Hab.* common.

F. LIGULATUS.
Lightf. Flor. Scot.
v. 2. t. 29.
Sheet D.

Fronde planâ, aveniâ, sub-triplicato-pinnatâ: ramis ramulisque distichis; foliis lineari-lanceolatis, spinoso-dentatis. *Lightf.* 946.—*Hudf.* (F. herbaceus.) 582.—*Linn. Tr.* 3. 123.—*With.* 4. 101.

OBSERVATIONS. Root, a fleshy knob, flat at bottom: stem flat, thicker in the middle, throwing out its branches from the edge: principal branches supra-decomposed; those near the bottom the largest, shortening upwards; the last division of branches having the edges set round with soft *cilia*, slender and acute pointed. Fructification, circular flat warts on the branches near the setting on of the Leaves. * Height often above a yard. Colour yellowish green. Native of deep waters. Mr. **PIGOTT** discovered a Plant of this Species at **POOLE**, with fibrous processes at the margins of all the leaves: which, as it was late in the year, seems to have reference to fructification. I have likewise found in some large specimens, flattened orbicular excrescences on the Stem, which I take to be feminiferous.—*Hab.* common in deep waters.

* See my Observations and Figure of a fructified summit of *F. tamariscifolius*, p. 45. t. xi. l. l. and of *F. pedunculatus*, t. xvi. ii; k, k. These filamentous processes merit strict attention.

F. KALIFORMIS.
Linn. Tr. v.
t. 18.
Sheet G. n. 1.

Fronde filiformi, subgelatinosâ, tubulosâ, ramosissimâ; ramis sparsis; ramulis subverticillatis, subulatis, obtusiusculis. *Linn. Tr.* 3. 226.—*With.* 4. 89.

OBSERVATIONS. Root, a small thick knob: frond cylindrical, tender and pulpy, round; often, if not always, having a small cavity in the middle; not of an equable thickness, but swelling and contracting. Principal stem of the thickness of a Goose-quill. The habit of this species is subverticillate. This Species has many varieties, and is closely connected with *F. articulatus*. Fructification: small sessile tubercles; colour a dilute pink or purple. N. B. *F. verticillatus*, *Lightf.* t. 31, is so nearly allied, that I cannot from his Drawing establish a distinct species; though one, if not more, will hereafter be discriminated, with all the parts more minute and filiform.—*Hab.* common.

F. LICHENOIDES.
Lightf. Flor. Scot.
v. 2. t. 22.
Sheet E. n. 3.

Fronde dichotomâ, ramosâ; ramis apice dilatatis: fructificatione in summitatibus concavis. (F. pygmæus) *Lightf.* 964.—*With.* 4. 100.—*Hudf.* (F. pumilus.) 584.

OBSERVATIONS. Root, a minute callous Knob, throwing up many shoots matted together, forming discs by contact, so as to spread in patches. The little branches are obtuse pointed, and in fruiting-time swell into a sort of tubercles, with an aperture in the middle: these apertures are wide, and not unlike the shield of a *Lichen*. This is one of the connecting links between aquatic and land plants, as its situation pretty accurately marks the line of high water. It can hardly be deemed a submersed Plant, living in many situations the greatest part of its time exposed to the sun and winds, and affords one among many instances of the wonderful power of Nature in accommodating herself to any situation. Height $\frac{1}{4}$ inch, colour on the rock, black; held to the light, olive.

Hab. common.

F. MEMBRA-

APPENDIX.

F. MEMBRANIFOLIUS. Fronde tereti, ramosâ: apicibus membranaceis, dilatatis, dichotomis, enerviis; tuberculis pedunculatis. *Linn. Tr. 3. 120.—With. 4. 106.*

OBSERVATIONS. Root, a minute Disc; stem flattened, but nearly cylindrical, branching; summits of the branches terminated with an expanded leaf-like membrane, much crumpled and curled, with sharp-pointed tips. Its membranaceous transparent substance renders it very nearly allied to some of the dilated varieties of *F. crispus*. It differs from *F. crispus* in fructification which is oval, sub-pedunculate, and produced on the branches below the membranaceous leaf. I have drawn a specimen from the I. of WIGHT, where the round branches are divided and subdivided before the leafy expansion takes place in the summit. I imagine many Species are included among the four varieties enumerated in the LINNEAN TRANSACTIONS.

Hab. I. of WIGHT, and not uncommon, at least some of the varieties, elsewhere.

F. OBTUSUS. Fronde cartilagineâ, filiformi, compressâ, ramosâ, pinnatifidâ; segmentis obtusis; tuberculis in apicibus. *Velley. Ic. 3. With. 4. 119.*

OBSERVATIONS. Root, a succulent Disc. Stem round, tender, pellucid, slightly compressed, much branched; branches sometimes opposite, often irregular, covered with obtuse and as it were truncated segments. On these are to be found the Seeds adhering to the inner side in clusters. The figure of Col. VELLEY is admirably drawn as well in its natural as magnified size; but it seems to differ from the *F. obtusus* of the LINNEAN TRANSACTIONS. This Species is perfectly gelatinous, and there has lately been discovered a Variety of a pea-green colour. Notwithstanding the difficulty of preserving it on paper, Col. VELLEY shewed me a beautiful Specimen collected at POOLE.—*Hab.* WEYMOUTH and I. of WIGHT.

VAR. α. I insert a Specimen more nearly allied to *F. pinnatifidus*, whose fructification is extremely singular, consisting of globular vesicles of a large size, with seeds immerfed as at n. 3.

F. PALMATUS. Fronde palmatâ, planâ. *Lightfoot. 933.—With. (U. palmata.) 4. 123.*

OBSERVATIONS. Having fully described *F. palmatus* before, p. 54, I just insert this, as my Figure was of a large Plant, with the margin throwing out pedunculate Shoots, and without having the palmated appearance of LIGHTFOOT's Plant, which however is not uncommon. Though the habit of the Plant, as delineated in Sheet F, is frequent, yet I incline to think from the base of Mr. LIGHTFOOT's Plant, added to the Description he has given, that his *F. palmatus* is an *Ulva*, and Mr. WOODWARD is of the same opinion. In this state the distinctive mark, viz. the pedunculate leaves at the edges, are seldom met with. I am convinced there are several Species nearly allied, one of which with narrow linear leaves I have presented to the Society, with immerfed tubercled Fructifications very numerous.—*Hab.* common.

F. PURPURASCENS. Fronde filiformi, ramofissimâ; ramulis setaceis, sparsis; tuberculis subrotundis, innatis. *Herb. Budd.—R. Syn. p. 50. 51.—Hudf. 589.—Lightf. 926.—With. 4. 113.—Linn. Tr. 3. 225.*

OBSERVATIONS. This is a tender succulent Species, elegant in its ramification, but distinguishable from every other when in fruit by the size and colour of its innate tubercles, which are ovate and purplish. It has been called *F. tuberculatus* by LIGHTFOOT; but that name is applied to *F. bifurcatus* of VELLEY and WITHERING. The tubercles are not air-bladders, but mucifluous vessels with imbedded granules of seeds. Col. VELLEY delineated a young Plant: the Plant which I have delineated was in maturity.—*Hab.* very common.

F. RUBENS. Fronde sub-membranaceâ, dichotomâ; ramis proliferis linearibus; ramulis apice dilatatis, bifidis; laciniis acutiusculis. *Herb. Linn. Buddle.—Ginanni Op. Posth. 61.—Buxbaum. 60.—Linn. Sp. Pl. 1630.—Hudf. (F. crispus.) 580.—Lightf. (F. prolifer.) 949.*

OBSERVATIONS. Root, an expanded callous Knob, with a short stem. It branches at first regularly, but in its future growth it propagates itself by shoots arising from the summits of former ones, not produced at the margin, as in *F. palmatus*, but a little within the surface of the Frond. This habit, called by LIGHTFOOT, chainlike, * is generally observable even without laceration; but in some young plants it is not found; and there is, as has been observed, a faint midrib in the bottom of the older segments. Its Fructification is singular, as the seeds vegetate on the frond of the parent plant, and seedlings may be seen sometimes simple with a minuteround crooked stalk, and a flat oval or circular head; at other times, either in pairs, or 3 or 4 together, causing the appearance of "the rudiments of branches," mentioned Linn. Tr. v. 3. p. 166, and which as they rightly conjecture "separate in time from the parent Plant." LIGHTFOOT's Plate is characteristic of it in its trailing state, I do not meet with it so tall.

Hab. common.

* "Catenato-prolifer." Linn. Tr. 3. 166.

F. SUBFUSCUS. Fronde filiformi, ramofissimâ; ramis sparsis; ramulis subulatis, alternis; tuberculis racemosis. *Linn. Tr. 1. 131.—With. 4. 115.—L. Tr. v. 3. 212.*

OBSERVATIONS. This is one of the shrubby species discovered by Mr. WOODWARD in the year 1789, and published by him in the first Vol. of the Linn. Tr. The Root is fibrous, and covered with *gluten*: Frond cylindrical, very much branched; branchlets short, and covering the shoots on all sides. The Fructification is situated in the *axilla*, on branching peduncles, each seed vessel having the appearance of the calyx of a Flower under the microscope. Colour reddish brown. Height 6 inches. Very common on the Beach at YARMOUTH. It is frequently found with large innate tubercles, which have never had any seeds discoverable in them, and are probably the *nidus* of an Insect. In this state, and under some of its varying appearances, it has been supposed to constitute a new Species, and as such is arranged in the Catalogue of Messrs. GOODENOUGH and WOODWARD as *F. variabilis*; the error being similar to that respecting *F. tamariscifolius* and *selaginoides*.

Hab. on the N. E. Coast generally.

F. TENU.

APPENDIX.

F. TENUISSIMUS.
Linn. Tr. v. 3.
t. 19.
Sheet G. n. 4.

Fronde filiformi, ramossimâ; ramis omnibus capillaribus alternis; ramulis acutis, tuberculatis. *Hudf.* (U. capillaris.) 571.—*With.* 4. 117.

OBSERVATIONS. Root fibrous, matted, throwing up numerous shoots, though it is sometimes solitary. Stem branching near the bottom. Branches alternate, capillary, subdivided: extreme branchlets short, swelling in the middle, and small at the setting on. Fructification, numerous adnate spherical granules, each containing one seed. Height from 3 to 12 inches. Colour, watery pale purple. Transparent vesicular processes are at times observable in the branches. These processes are attempted to be delineated in Pl. 19. L. Tr. but I think they disguise the Plant. The Drawing of Sheet E was furnished by Friend MASON of YARMOUTH, a very fedulous marine Botanist; and it is, I think, a Master-piece of Art.—*Hab.* I. of WIGHT, WEYMOUTH, &c. &c.

F. TUBERCULATUS.
With. Bot. Arr.
v. 4. t. 17. f. 1.
Sheet A. n. 1.

Fronde filiformi, dichotomâ; ramis inæqualibus obtusis, apice tuberculatis; angulis ramificationum obtusis. *Raii.* Syn. 43. n. 13.
—*Hudf.* 588.—*With.* (F. bifurcatus.) 4. 109.

OBSERVATIONS. Root, a callous Knob. Stem perfectly cylindrical, glossy, transparent, rigid; the size of a Raven's quill, or larger; branching near the summit; often dichotomous, though sometimes irregular, but always forming a roundish angle with the stem. The summits, which are furcated, and turn inwards, swell at the time of fructification, and throw out conical papillæ, under which are the orbicular seed-bearing Masses. This Species has been delineated in Dr. WITHERING's Botanical Arrangement under the expressive name of *F. bifurcatus*, with a Description from Col. VELLE. It is a very common Species in CORNWALL, and is very beautiful in fructification, as the granules are to be seen distinctly on the inside through the transparent mucus.

Hab. CORNWALL: ACTON CASTLE, plentiful.

F. VERTICILLATUS.
Lightf. v. 2. t. 31.
No Drawing.

Fronde, tubulo-â, sub-articulatâ, ramosâ; ramis verticillatis, subulatis, fetaceo-ligulatis. *Lightf.* 962.—*With.* 4. 90.

OBSERVATIONS. I just notice this Plant, as it has been figured by LIGHTFOOT; but in his Plate, the inattention of the Engraver to its capillary parts, is so great * that I shall not venture to decide whether in any thing it differs from *F. kaliformis*. Many varieties of *F. kaliformis* are completely whorled.—*Hab.* SCOTLAND.

* See *F. kaliformis*.

F. PATENS.
Sheet A. n. 3.

Fronde dichotomâ, lineari apicibus, obtusiusculis, planis; tuberculis sub-globosis, sparsis.

OBSERVATIONS. This Species is established in the Linnean Catalogue, but not in such a manner as in my judgment separates it from *F. crispus*, I here give their specific character, and the delineation is from a Specimen of Mr. WOODWARD's.

Hab. MARAZION, CORNWALL.



BOTANICAL REFERENCES,

Which occur under ABBREVIATIONS in this Work.

Act. Gall.	Acta Gallica secundum Annos Digesta.	Herb. Linn.	Herbarium LINNEI penes Jac. Ed.
Bauh. Pr.	Caspari Bauhini Prodomus 1646. 4to.	— Sherard.	SMITH, Norvici
— Pin.	— Pinax	—	SHERARDI in Hort. Med.
Bast.	Basteri opuscula subseciva 1762. 4to.	Imp. Nat. Hist.	Oxon. —
Buddl.	Buddlei Hortus siccus in Museo Britannico	Linn. Syst.	Imperati Historia Naturalis
Dod.	Dodonæi stirpium historiae pemptades VI. 1616. fol.	— Sp. Pl.	Linnei Systema Naturæ, cura Gmelin 1791. 8vo.
Eng. Bot.	English Botany. Plates by J. Sowerby	Lightf.	Species Plantarum 1747. 8vo.
Esp. Ic.	Icones Fucorum cum char. system. Eug. I. Esper 1798. 4to.	Mantiff.	FLORA SCOTICA; by the Rev. W. LIGHTFOOT 1777. 8vo.
Fl. Dan.	Icones Pl. Floram Danicam illustrant. In fasciculis. fol.	Morif.	Mantiffa Plantarum Linn. Fil. 1767. 8vo.
Fl. Ang.	Hudsoni Flora Angliæ 1778. 8vo.	Oed. Dan.	Morisoni Plantarum Hist. univ. 1680. fol.
Fl. Lapp.	Linnei Flora Lapponica 1737. 8vo.	Petiv.	Flora Danica, supra
Gunn.	Gunneri Fl. Norvegica 1772. fol.	—	Ray's English Herbal illustrated by W. Petiver 1695.
Gent. Mag.	The Gentleman's Magazine	Park.	Parkinson's Theatrum Botanicum 1640. fol.
Ger. em.	Gerard's Herbal amended by Johnson 1636. fol.	Pet. gaz.	Petiveri Gazophylacium Naturæ et Artis
Giseck.	Giseckii Index Linneanus cum fig. 1779. 4to.	R. Syn.	Raij Synopsis 1724. 8vo.
Gmel.	Gmelini historia Fucorum. Petrop 1768. 4to.	Roy. lugd.	Floræ Leidenfis Prodomus a Royen 1740. 8vo.
Hist. Ox.	Morisoni Plantarum hist. universalis; Oxon 1680. fol.	Seb.	Sebæ Thesaurus
Hudf.	Hudsoni Flora Anglica 1778. 8vo.	Vell. Inq.	Coloured Figures of Marine Plants by T. Velle, Esq. 1795. fol.
		With. or With.	Arrangement of British Plants by W. Bot. Arr. Withering, M. D.

A

GENERAL INDEX,

With Foreign Synonyms, omitted in the Body of the Work, arranged
Alphabetically.

F. ABROTANIFOLIUS.

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Abrotanioides. See Fæniculaceus.
Aculeatus. Stachlichter Tang. Esp. Ic. p. 72. mit faden-
* p. xxiii. 24. formigen breitgedruckten, sehr astigen Zw-
xxxiv. eig, und pfriemenformigen abwechselnden,
aufrechtin, zu beyden seiten aufstehenden
weichen Stacheln.
Alatus. Geflügelter Tang. Esp. Ic. p. 20. mit hauti-
p. 79. gen, nicht ganz zweytheiligen, geribten
Blättern, und herablaufenden abwechselnde-
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Ceranoides. p. 71.
Cæspitosus. Spec. nov.
p. 59. xxxvi.
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gen, lanzetformigen, sprossenden, gefranz-
ten Blättern. Getand Zee-Ruy, Houtt. 2.
307.
F. fronde planâ, laciniatâ; margine ciliato;
primordialibus linearibus. Neck. Meth. p.
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Corneus. p. 61. xxxvi. not the F. corneus of Gmelin and Esper.
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Dentatus. p. 95.
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und gerundeten Stamm. Gevingerd Zee-
Ruy, Houtt. 2. 302.

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p. 88. gen, fast in gleicher hohe aufrecht stehen-
den Zweigen. Esp. 98.
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tang. Esp. Ic. 47. Fadenformiger, einfa-
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nender Tang. Peefachtig Zee-Ruy, Houtt.
2. 296. Martöume. Rokkefnorer. Fiol-
straenge. Gunn. 2. 347.
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Gigartinus. App.
Gracilis. p. 100. xxx. Spec. nov.
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Ligulatus. App.
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xxxix. ger Tang, met aufrectstehenden, gerundet-
en Stamm, sehr langen Aesten und fur sei-
te aufstehenden, kugelformigen Fruchtbehalt-
nitzen.
Loreus. p. 37. Riemenformiger Tang Esp. Ic. 43. met fa-
xxxv. denformigen zusammengedruckten, zwey-
theiligen, auf beyden Seiten ganz met
rundliken hockern besetzten Zweigen.

- F. hyperboreus. Gunner. Tare vel Tarre-leg.
Gunn. Norv. p. 34.
Tweedragtig Zee-Ruy, Houtt. 2. 296.
Huas tang. Gunn. 2. 514.
Ungleich formiger Tang. Esp. p. 59. mit
gerundetem Stamm; weichen, sehr zahlrei-
chen Stacheln; zweizeiligen, zum Theil
gesiederten, gleichbreit-lanzetformigen, und
fageformig gezahnelten Blättern.
Var. of F. crispus.
See Tamariscifolius.
Abrotanoides, Gmel. (omitted; See p. ult.)
Ner. Brit. F. lumbricalis of Linn. Tr. and
Gmelin.
mit fadenformigen, zweytheiligen, sehr asti-
gen, fast in gleicher hohe aufrecht stehen-
den Zweigen. Esp. 98.
Getopt Zee-Ruy, Houtt. 2. 198. Horned
Strand Klever. Gunn.
Bertramahnlicher Tang. Esp. Ic. 65.
Sehnenformigen Tang, Meer-faden; Meerf-
tang. Esp. Ic. 47. Fadenformiger, einfa-
cher, sehr weicher, nicht ganz durchschei-
nender Tang. Peefachtig Zee-Ruy, Houtt.
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App.
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ger Tang, met aufrectstehenden, gerundet-
en Stamm, sehr langen Aesten und fur sei-
te aufstehenden, kugelformigen Fruchtbehalt-
nitzen.
Riemenformiger Tang Esp. Ic. 43. met fa-
denformigen zusammengedruckten, zwey-
theiligen, auf beyden Seiten ganz met
rundliken hockern besetzten Zweigen.

* N. B. The Roman Numerals shew the pages in the Preliminary Observations; the others refer to the Body of the Work.

† Houttuyn Nat. Hist.

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p. 13.
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xxxvi. & App.
Palmetta. p. 102. Palmetten Tang. Esp. Ic. p. 84.
xxx. Fuco ramofo, membranaceo con foglie larghe, nella fommita ritonde, simili alla lattuga marina. Ginanni, p. 20.
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Plicatus. p. 28. Verwickelter Tang. Esp. Ic. p. 78. haarformiger, sehr aftiger verwickelter, halb durchfichtiger Tang.
xxii. xxxiv.
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Rubens. *F. rubens.* Ner. Brit. p. 18. is *F. sinuofus,* L. Tr. from the Linnean Herbarium.
Rofeus, p. 94. xxix.
Sanguineus. p. 20. Rosenfarbiger Tang Esp. Ic. p. 79. mit hautigen ablangunden, glattrandigen, gefielten Blättern und gerundeten, aftigem Stamm.
Bloed Keurig Zee-Ruy, Houtt. 2. p. 305.
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Teres. Tetragonus. See *F. esculentus.* App.
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Viridis. p. 112. xxvii.
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OMITTED IN THE APPENDIX.

FUCUS FÆNICULACEUS. Fronde filiformi, ramosissimâ; ramis sub-dichotomis: foliis subulatis æqualibus; veficulis oblongis, innatis, vel axillaribus, *Herb. Linn.—Buddl. p. 15. n. 23.—Petiv. 34. n. 4, 5. 6.—Act. Gall. 1712.—L. Sp. Pl. 1629.*
F. concatenatus. Hudf. 574.—Lightf. 923.—Velley. t. 2. f. 1.

OBSERVATIONS.

This Plant has been ascertained by the *Linnean Herbarium* to be the true *Fæniculaceus* of that Author; GMELIN'S *F. fæniculaceus* appears there as *F. barbatus*, and as such I have described and figured it, p. 83. *F. concatenatus*, LINN. is a Species not yet found on our Coast. I follow the Authority of Messrs. WOODWARD and GOODENOUGH, the former of which Gentlemen, as likewise my Friend Mr. TURNER, have seen the Specimen delineated in the Sheet abovementioned, the original being in the possession of the LINNEAN SOCIETY. I sincerely hope the Descriptions and Drawings, which are to be met with in this Work, will finally settle these Species, which are so nearly allied to each other in habit of growth. The oval veficles, when innate and strung on the Branches, and the triangular axillary ones, distinguish this *Fucus*: they are filled with *mucus*, and have punctures for the discharge of the seed.

Hab. The Specimen, from whence the Drawing was taken, was sent me by LADY ELIZ. NOEL, to whom the Science of Botany owes many obligations. It was gathered near POOLE, DORSETSHIRE, and is plentiful along the Southern Coast.

ERRATA.

- Page 1. *for ampletetur read ampletitur.*
 xx. *dele flagelliformis.*
 xxiv *for destinatis r. distinctis.*
 ib. teriti tereti.
 ib. racemosi racemosæ.
 xxviii in the note è è è e, e, e.
 ib. propaginus propagines.
 xxxii quotes quote.
F. veficulosus, Pl. II. the Frond should be punctured in the same manner as Pl. I.
F. rubens, Pl. VII. a, stem nat. size; b, magnified leaf with the fructified veficles; d, stem magnified with a simular fructification.
F. sanguineus, ib. a, b. last page, r. p. 30, being the last page of Fasc. I.
F. tomentosus, ib. by an error of the Engraver it is drawn with black tubercles, and otherwise not so downy and velvety as it ought to be.
 31 *for efundetur r. effunditur.*
 71 to *F. ceranoides, Sherardi, Pinaftroides. add Tab. XIII.*
 75 *for fecundis r. secundis.*
 79 modo quidam modo quodam.
 80 marginal magnified.
 95 truncated truncated.
 102 tabulatum tabula autem:
 ib. exacti exactè.
 ib. (in a note) descriptis disruptis.
 106 referendi sunt referendus est.
F. plumosus, dele Tab. XVI. F. coccineus, id.
F. dentatus, Pl. xv. c, fructified branch magnified; c, c, a single veficle; d, a seed.
F. roseus, ib. g, a bit of the fructified stem; gg, ditto magnified; h, h, h, feminiferous veficles.
F. confervoides, ib. i, magnified bit; i, i, magnified tubercles.
F. longissimus, Pl. XVI. c, an inflated veficle cut in two and magnified; c, c, seeds; d, a tip with lateral clustered tubercles.
F. gracilis, ib. f, f, fummits with tubercles magnified.
F. pedunculatus, for Pl. XVII, r. Pl. XVI.

N. B. The Binder will observe to put all the Preliminary Observations of the three *Fasciculi*, which are paged with Roman Numerals, in the beginning of the Volume: the Plates are to face the Pages, as follows, Pl. i. p. 2. ii. p. 4. iii. p. 6. iv. p. 8. v. p. 12. vi. p. 16. vii. p. 20. viii. p. 28. ix. p. 34. x. p. 38. xi. p. 56. xii. p. 70. xiii. p. 78. xiv. p. 90. xv. p. 98. xvi. p. 106. xvii. p. 112.

